

UROSKOP Access

SP

Adjustment

System

FLC Imaging System

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Document revision level

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4 Changes to Previous Version 76


General information

Notes



NOTE	Depending on the system version, the illustrations and drawings may deviate slightly from the system supplied.
NOTE	The name of menu items on screens can deviate depending on the chosen user language (regional settings). The menus mentioned in this document are based on the English language.



Safety information

General safety information

 WARNING	<p>Danger of property damage, injury, death!</p> <p>Non-observance can lead to property damage, injury or death.</p> <ul style="list-style-type: none"> ⇒ Observe the general safety instructions in this document, in the document “Medical Products; Safety Information; System“ (TD00-000.860.01.xx) and the safety instructions according to ARTD part 2.
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General safety information - electrical

	 WARNING	<p>Electrical safety!</p> <p>Non-observance can lead to property damage, serious injury or death.</p> <ul style="list-style-type: none"> ⇒ After the covers are opened, parts under voltage are exposed. To avoid hazards, the system has to be disconnected from the power line prior to opening the covers. ⇒ If work is required while voltage is live, the general safety instructions according to document “Medical Products; Safety Information; System“ (TD00-000.860.01.xx) have to be observed.
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	 CAUTION	<p>Live parts!</p> <p>Non-observance can lead to property damage.</p> <ul style="list-style-type: none"> ⇒ Observe the ESD guidelines for working on the system.
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Safety information - radiation

**WARNING****Radiation!**

Non-observance can lead to illness, irreversible damage to body cells and genetic structure, or death.

- ⇒ During work on the system that necessitates the release of radiation, the safety and radiation protection guidelines pursuant to ARTD part 2 (ARTD-002.731.02) must be observed.
- ⇒ Ensure that all available radiation protection devices are used, that radiation protection clothes are worn, that the distance to the source of radiation is as large as possible, that radiation is only released if necessary, and that the set-up values are as low as possible (low kV and mA values, short switch-on time).

Safety information - mechanical**CAUTION****Danger of burns from hot parts or components!**

Non-observance can lead to minor or moderate burns, especially to the hands. After cover panels are opened, components (especially cooling elements and high-performance parts) that can reach temperatures $> 50^{\circ}\text{C}$ are exposed.

- ⇒ To prevent burns caused by touching parts and components, the system must be switched off and allowed to cool down for at least 5 minutes.

CAUTION**Danger of injuries from mechanical parts!**

Non-observance can lead to minor to moderate injuries, especially to the hands. After covers are opened, parts like plugs, threaded bolts, shortened cable fixtures and edges of components can be accidentally touched, possibly resulting in contusions, abrasions and cuts of the skin.

- ⇒ Carry out such work with special caution.
- ⇒ Wear suitable protective gloves.

Safety information - risk of infection

CAUTION

Risk of infection from bacteria/viruses!

Non-observance can lead to severe injuries and even death.

- ⇒ This product can be contaminated by infected blood or other body fluids.
- ⇒ Avoid all contact with blood or other body fluids.
- ⇒ Strictly observe the safety information in ARTD part 2 (ARTD-002.731.37) regarding prevention of infectious diseases during customer service calls.

Abbreviations

Calc.	Calculation
DR	Exposure
ESD	Electrostatically-sensitive device
FLC	FLUOROSPOT Compact
fluoro	Fluoroscopy
FW	Firmware
IEM	Image evaluation mode
I.I.	Image intensifier
IQ	Image quality
IQAP	Image quality assurance protocol
LED	Light emitting diode
LIH	Last image hold
OGP	Organ program
PDA	Photo diode array
PFL	Pulsed fluoroscopy
ROI	Region of interest
SS	Service switch
SSW	Service software
SW	Software

Product-specific notes

Required documents

ARTD "Prophylactic Measures against Infectious Diseases during Service"	ARTD part 2 (ARTD-002.731.37)
ARTD "Radiation Protection RD and CT"	ARTD part 2 (ARTD-002.731.02)
ARTD "Safety and Radiation Protection Guidelines"	ARTD part 2
ARTD "Service PC and Service Software"	ARTD part 1 (ARTD-001.719.06)
Circuit Diagram; 37 83 300 Uroskop Access Serial No. from 01211	SPL5-330.844.03.xx
Installation Instructions; System	SPL5-330.812.01.xx
Medical Products; Safety Information; System	TD00-000.860.01.xx
Quality Assurance; IQAP	SPL5-330.820.02.xx
Replacement of Parts; System; Basic Unit and Imaging System	SPL5-330.841.01.xx

Lubrication points

NOTE

Before performing any adjustments, check the condition of all accessible chains and spur gears, sliding and rolling guides and, if necessary, lubricate them with Longtime PD 2 (unless otherwise stated).

Required aids and tools

NOTE

All tools, measuring and auxiliary devices with the exception of the standard installation tools are listed in the Service Tools Catalogue (part of the Spare Part Catalogue).

CD "UROSOP System SW CD"	77 57 656
Centering cross	96 60 051 RE999
cm scale	n.a.
ESD equipment type 8501 - 3M	97 02 606 Y3121

Ground wire tester ¹	44 15 899 RV090
Loctite 221 (for threaded connectors)	20 48 874
Longtime PD2 (tube 20 g) (pressure lubricant for long-term lubrication of bearing cages, open ball bearings, chains, cables, etc.)	34 91 271
PTW DIADOS	97 17 612 KE999
Safety Tester Unimet 1100 ²	51 38 727 Y0766
Service cable (5 m)	99 00 440 RE999
Service PC as specified in ARTD-001.719.06	n. a.
Spirit level	n. a.

1. The safety tester Unimet 1100 can be used as replacement for this measuring equipment.
2. This universal test meter can be used for testing the electrical safety of medical equipment per DIN VDE 0751 and EN 60601.

Replacement of mechanical parts and adjustments

NOTE

After the replacement/adjustment of mechanical components, a function test must be performed.

Detailed information is given in the corresponding sections of document "Replacement of Parts; System; Basic Unit and Imaging System" (SPL5-330.841.01.xx), in the XCS SSW or the UROSKOP Access SSW.

Corrective measures / settings

NOTE

In several places in the document, reference is made to the XCS SSW for corrective measures and settings.

- Select **Components > Urooskop** in the XCS SSW and subsequently **Adjustment**.

Contents of the service and system software

NOTE

Using the compatibility list included in the shipment, check the compatibility of the SCU (XCS), System SW, SSW and FW versions.

- Connect the PC to the XCU with the service cable.
- Start the XCS SSW.

- Select **Info**.

Image quality

NOTE

After each replacement or adjustment of components of the image chain, an image quality test (IQAP) (SPL5-330.820.02.xx) must be performed.

In addition, the tests required under the regulations of the relevant country (e. g. USA [DHHS], Germany [§ 16 X-ray Ordinance]) must be carried out.

Covers

NOTE

Detailed information for removing and attaching the covers can be found in document “Installation Instructions; System“ (SPL5-330.812.01.xx).

Make sure that the cover screws have the correct length. Otherwise there is a risk of damage.

To remove the covers, it is sometimes necessary to move the unit, especially the tabletop. To remove the covers, simply engage the **EMERGENCY STOP** of the unit on the table or on the lifting base. Release the **EMERGENCY STOP** when movement is required.

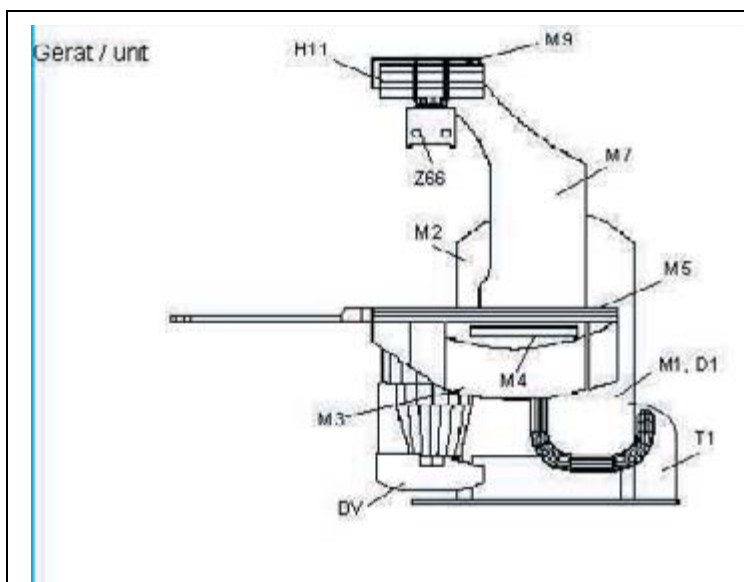


Fig. 1: Components

The locations of the UROSKOP Access components are shown in (Fig. 1 / p. 10).

- After the removal/attachment of the I. I. protective cover, perform a function check of the collision protection switches.

- The unit cover (M7) must be inserted laterally. Watch the cover of the tube support arm to prevent it from being scratched.
- All rubber seals must be properly in place on the covers.

Testing the protective ground wire

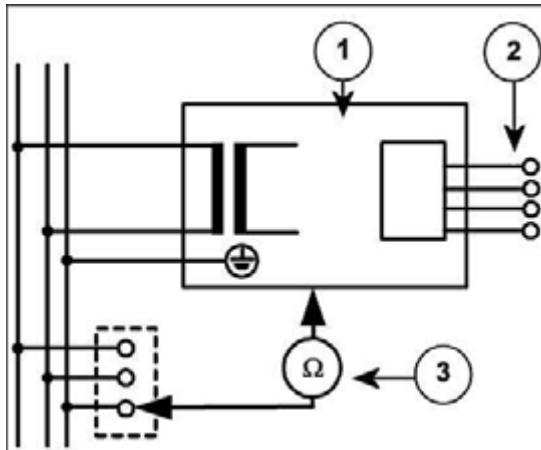


Fig. 2: Measuring circuit for measuring the ground wire resistance in systems that are permanently connected to the power supply net (per DIN VDE 0751-1:2001-10, Fig. C3).

- Pos. 1 System
 Pos. 2 Type B Applied Part
 Pos. 3 Measurement Setup (integrated into test meter)

- The protective ground wire test must be performed after every intervention in the system, i. e. if parts/components that can significantly influence the protective ground wire resistance are replaced (e. g. changes to the on-site electrical system, change in the setup location, expansion of the system, replacement of the power-up module, replacement of multi-pole connection cables, which also create the protective conductor connection between system parts) or if protective conductor connections have been repaired, evaluated and documented.
- Perform the ground wire test according DIN VDE 0751, part 1 (ARTD, part 2). Ensure that the system is completely installed, all covers are attached and all ground wire connections have been made. Test the protective ground wire resistance between the protective conductor bar for the entire system and any accessible, conductive part of the product during the normal operating state of the system.

The protective ground wire resistance may not exceed 0.2 Ω .

NOTE

For evaluation purposes, the first measured value and the values documented during maintenance or safety checks have to be compared to the measured values. A sudden or unexpected increase in the measured values may indicate a defect in the protective ground wire connections - even if the limit value of 0.2 Ω is not exceeded.

NOTE

Ensure that control or data cabling does not affect ground wire connections.

Image Evaluation Mode (IEM)

Some measurements are performed with the implemented “Image Evaluation Mode” (IEM). To access the IEM, the following steps are necessary:

- Store the LIH image via the **Store Fluoro** button for evaluating a fluoro image (Fig. 3 / p. 13).
 - This is not necessary for evaluating DR exposures.

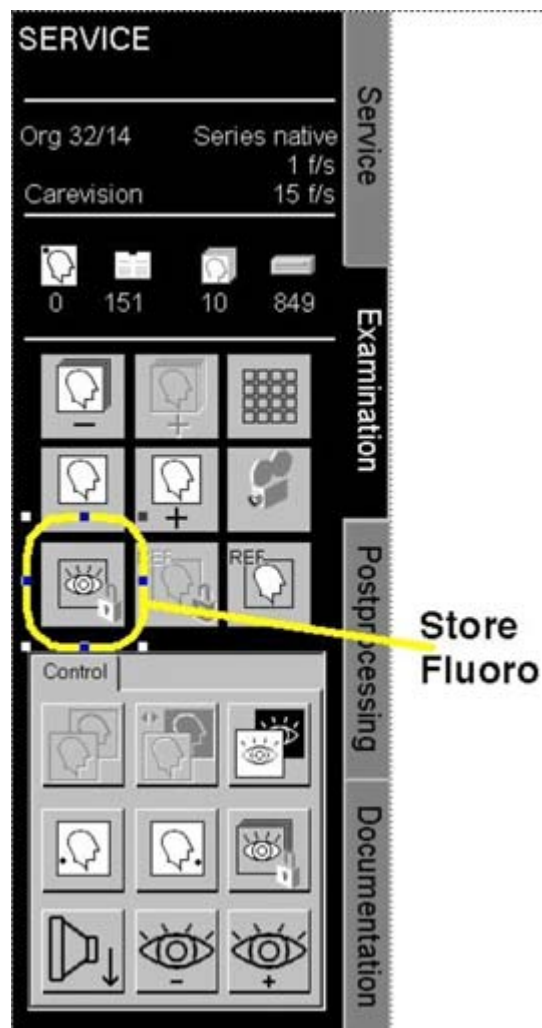


Fig. 3:

- Select the **Patient** task card and the **Settings** sub task card and press the **IQ** button
(Fig. 4 / p. 14).
 - ⇒ The display will change to the **Postprocessing** task card (Fig. 5 / p. 15).

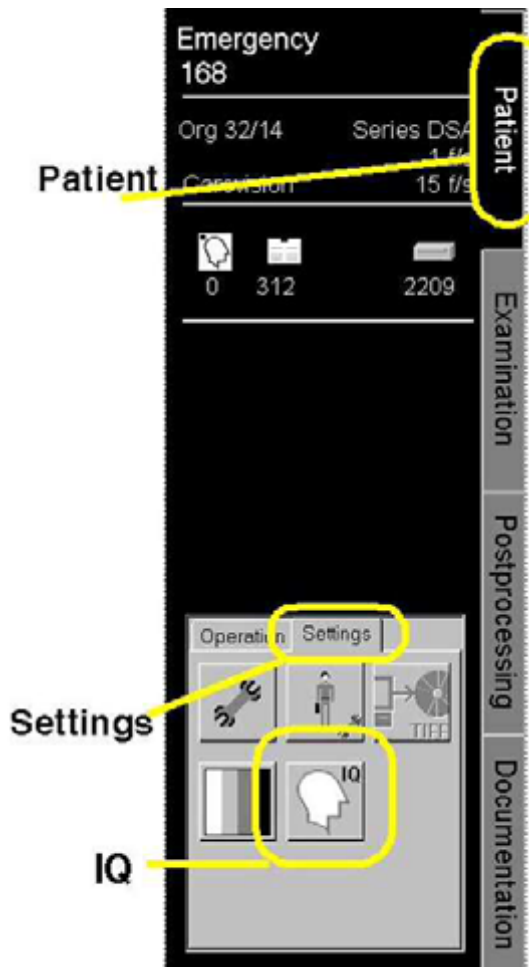


Fig. 4:



Fig. 5:

- ➡ The display will show the last stored image (LIH or exposure) and buttons to evaluate the image in the operation area.

Image evaluation functions

- ROI 20: displays an ROI with 20 x 20 pixels. You can move the ROI to any position in the image.
- ROI 50: displays an ROI with 50 x 50 pixels. You can move the ROI to any position in the image.
- Line profile: displays a horizontal line plot.
- Remove: removes all ROIs and/or line plots.

Service organ programs

On UROSKOP Access systems, 4 different service organ programs OGP 1 - OGP 4 are stored and accessible. The parameters of the service organ programs are listed in the document "Quality Assurance; IQAP" (SPL5-330.820.02.xx). To select one service organ program, just select the OGP from the list box (Fig. 6 / p. 17).

- Enter the FLC service mode.
- Select the **Examination** task card and subsequently the **Settings** sub task card.
- Select the **Organ program** button.

⇒ The following window appears (Fig. 6 / p. 17).

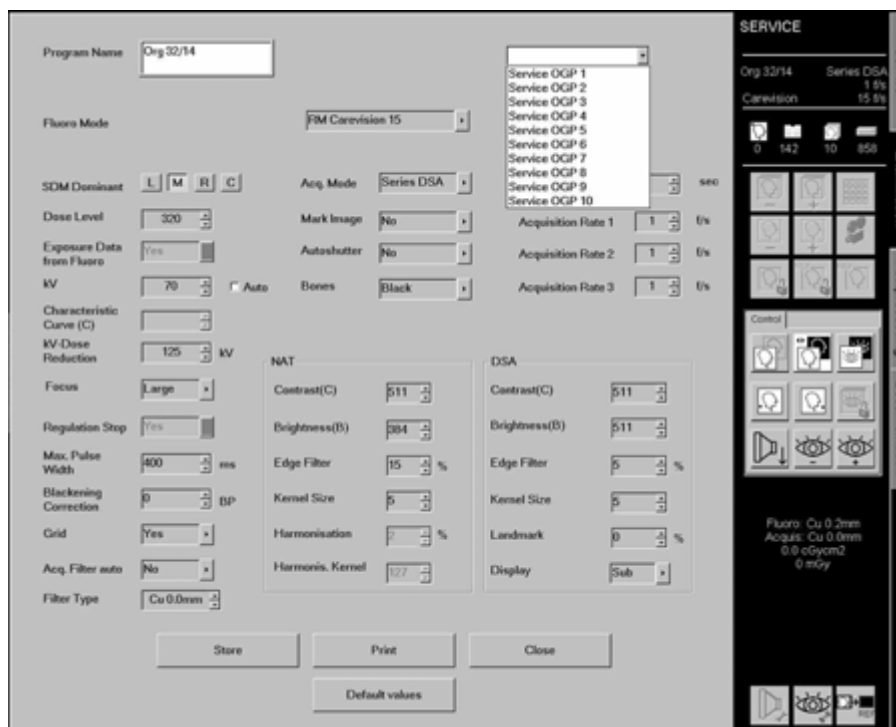


Fig. 6:

Setting the central ray

Aligning the X-ray tube central ray vertically

Prerequisites

- Remove the tube assembly housing.
- Remove the collimator.
- Check the image acquisition system with a spirit level.
 - ⇒ The image acquisition system must be in the 0° position, vertical to the table.
- Check the tabletop with a spirit level close to the column.
 - ⇒ The table must be horizontal.

Adjustment



Fig. 7: Central ray

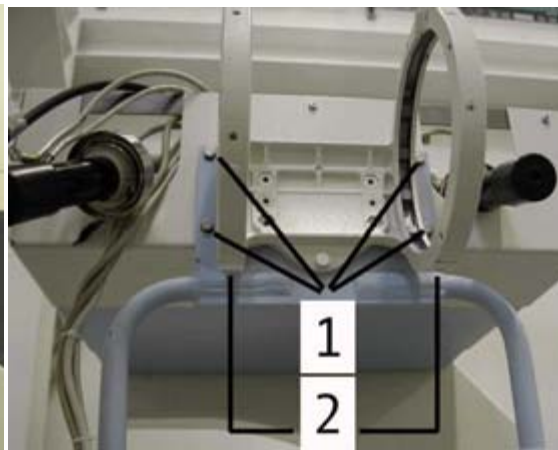


Fig. 8: Central ray

- Using the spirit level, align the **tube housing flange** horizontally in the transverse and longitudinal direction (Fig. 7 / p. 18).
 - Longitudinal direction: the tube assembly can be adjusted by unscrewing the 4 Allen screws of the tube assembly holder (1/ Fig. 8 / p. 18).
 - Transverse direction: by unscrewing the two Allen screws from the holders of the tube assembly housing (2/ Fig. 8 / p. 18).
- After the adjustment and attachment, check the tube housing flange again to make sure that it is horizontal in all directions.

Aligning the central ray to the I.I.

Prerequisites

NOTE

The vertical alignment of the central ray ([Aligning the X-ray tube central ray vertically / p. 18](#)) has to be performed prior to this adjustment.

- The collimator must be mounted on the flange and all cables must be connected.
- The tabletop is not in the radiation area (end position).
- The protective cover of the I.I. has been removed.
- The I.I. grid has been removed (mark the location of the grid before removing it).
- The center of the I.I. is marked with crosshairs.
- The tube assembly is in the exposure position.
- Register a new patient in the **Patient** task card.



Adjustment

- Briefly release fluoro.
- Store the LIH image via the **Store** button.
- Evaluate the stored LIH image.

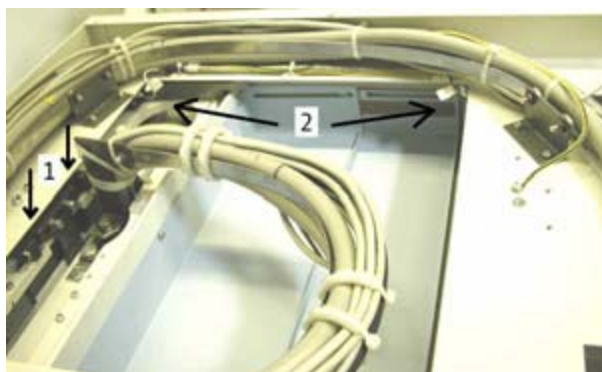


Fig. 9: Central ray

NOTE

In the exposure position, the tube assembly transverse carriage must always be at stop. The exposure position switch must be positively actuated (< 2 mm tracking).

- In the longitudinal direction:
 - Close the collimator and open the width diaphragm.
 - Adjust the tube assembly with the two adjustment screws (arrows 1 ([Fig. 9 / p. 19](#))) on the longitudinal carriage so that the center of the cross is visible on the monitor centrally between the collimator leaves in the longitudinal direction. Then attach the tube assembly.

Deviation: $\leq 2 \text{ mm}$

- In the transverse direction:
 - Close the collimator, then open the height diaphragm.
 - Adjust the tube assembly with the exposure position switch ((Fig. 9 / p. 19), arrows 2 for exposure position and park position) of the stop so that the center of the cross is visible on the monitor centrally between the collimator leaves in the transverse direction. The transverse carriage will hit the stop only lightly.

Deviation: $\leq 2 \text{ mm}$

Checking the coincidence of radiation field center and film center

Prerequisites

NOTE

The alignment of the central ray to the I.I. ([Aligning the central ray to the I.I. / p. 18](#)) has to be performed prior to this adjustment.

- Cassettes without intensifying screens are available.
- Move the tube assembly and I.I. in the exposure position.
- Remove all Cu filters (if inserted in collimator).
- Move the unit into 0° position.

Check

- Select the **Examination** task card and select **Uroskop Cassette, 70 kV** and **320 mAs** in the list box of the **Settings** sub task card ([Fig. 10 / p. 20](#)).

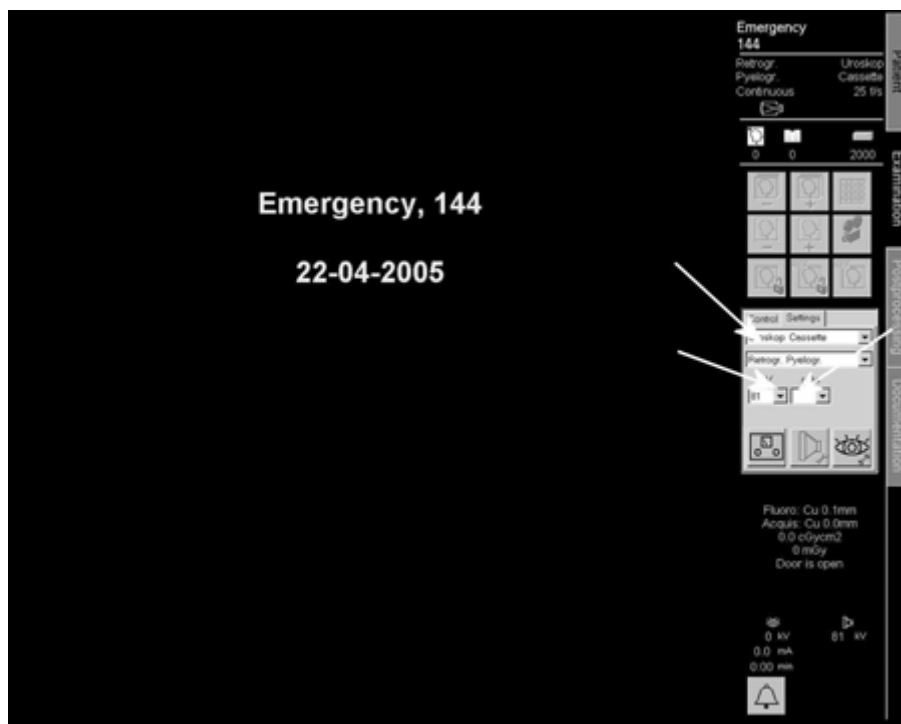


Fig. 10:

- Place a cassette with a center and side marker with film into the cassette tray.
 - ⇒ The side marker should be located approx. 3 cm below the center diagonally.



- Release DR in following positions with the same film according Tab. 1.

Tab. 1

0° position	approx. 10 cm x 10 cm collimation
+90° position	approx. 15 cm x 15 cm collimation
-90° position	approx. 20 cm x 20 cm collimation

- Develop the film and note the exposure date/data on it.

Evaluation

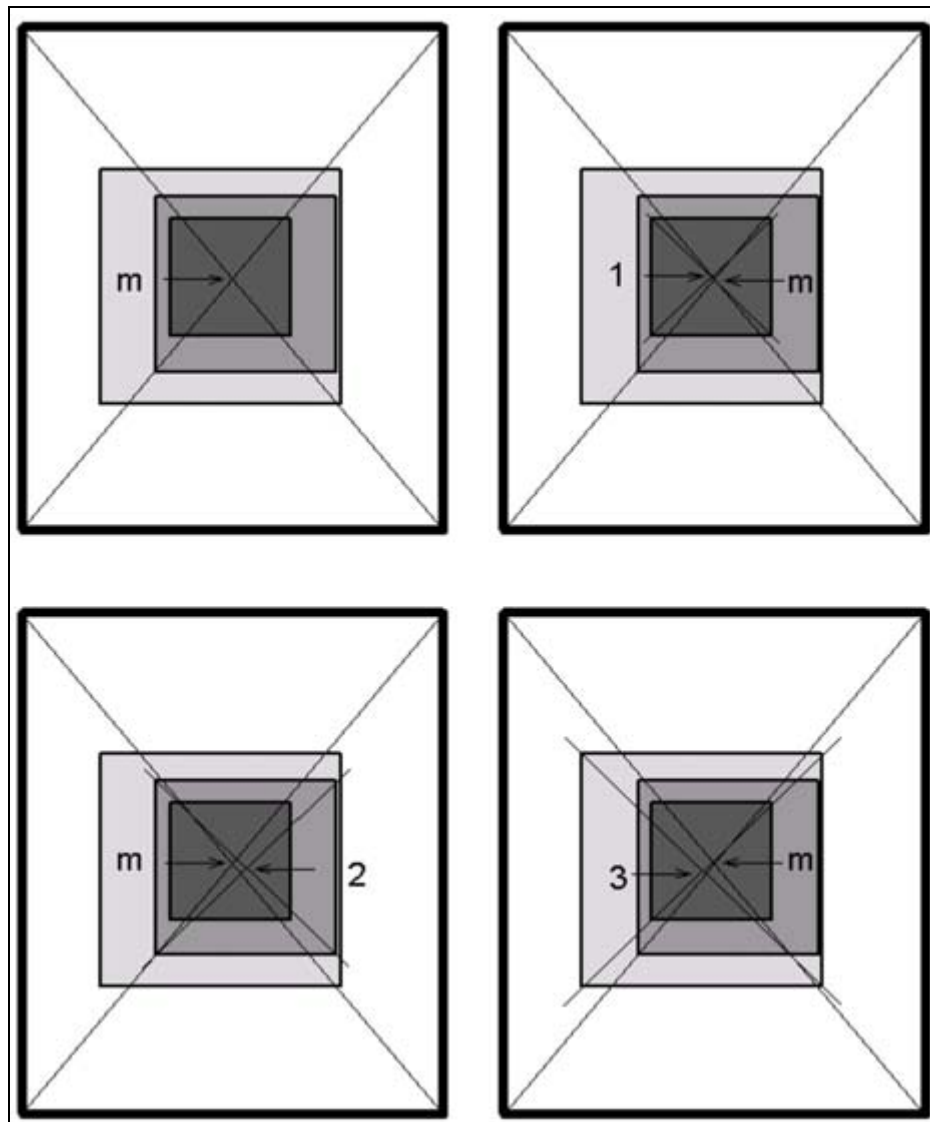


Fig. 11: Cassette central ray

- Draw the diagonals in each case on the film (Fig. 11 / p. 21):
 Diagonal m => film center
 Diagonal 1 => 0° position (10 cm x 10 cm)
 Diagonal 2 => +90° position head up (15 cm x 15 cm)
 Diagonal 3 => -90° position "Trendelenburg" (20 cm x 20 cm)

- Measure the distances (center deviation) from the center of the film (m) to the central ray centers (1; 2; 3).
- Max. permissible deviations:

Tab. 2

For 10 cm x 10 cm collimation	Center deviation $m \leq 7 \text{ mm}$
For 15 cm x 15 cm/20 cm x 20 cm collimation	The following center deviation applies: (Fig. 12 / p. 22)

$$\text{Centerdeviation} = \frac{m}{115\text{cm}} \times 100 \leq 1.2\%$$

Fig. 12:

Checking the fluoroscopic field limitation and centering

NOTE

If the “Visibility of iris diaphragm” check or “Adjusted mA during dose setup” according to document “Quality Assurance; IQAP” (SPL5-330.820.02.xx) fails, this adjustment procedure has to be performed.

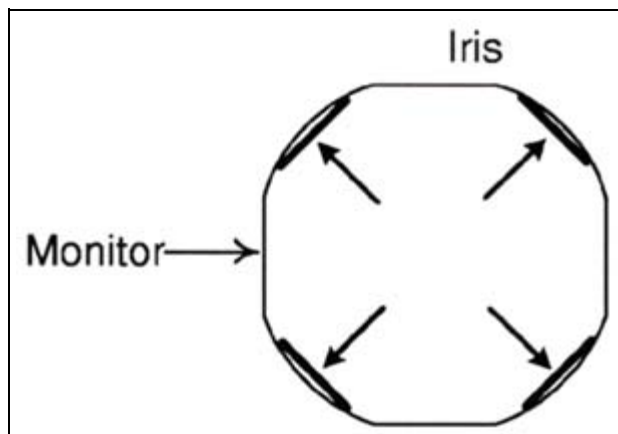


Fig. 13: X-iris



- Move the unit into the 0° position.
- Select zoom format 0 (full format).
- Open the collimator fully.
- Switch SS to “on” position.
- Release fluoro.
- Check whether all iris leaves are visible and symmetrically adjusted ([Fig. 13 / p. 23](#)).
- Check the diagonal iris leaves for all zoom formats.
- Terminate fluoro.

NOTE

In addition, the tests required under the X-ray regulations of the relevant country (e.g. USA [DHHS], Germany [§16 X-ray Ordinance] ...) must be carried out.

Evaluation

NOTE

The four collimator blades have to be slightly visible and symmetrical for all zoom formats.

Symmetrical tolerance: 5 mm on the monitor (not depending on the monitor size)

Correction

- Start the XCS SSW.
- Select the menu **Components > Urooskop > Adjustment > Calibration**.



- With fluoroscopy on, set the iris diaphragms with the \pm button.
- Confirm with **OK**.
 - ⇒ A window is displayed with the new and the old value.
- Confirm with **OK**.
 - ⇒ The new value is stored only in the unit.
- Exit the service mode and switch the system off and on to enable permanent storage in the XCU.
- Check the setting.

Checking the cassette

Overframing of the cassette

Prerequisites

The nominal format programmed for the cassette is 35 cm x 43 cm, but the real film size is 35.6 cm x 43.2 cm (14" x 17"). The "overframing" compensates for the difference between these two sizes.

Adjustment

- Select the XCS SSW menu **Components > Uroskop > Adjustment > Calibrations > Collimator > Direct technique collimation, overframing of film** and press the **Execute** button.
- Enter the desired overframing in mm for height and width.
 - ⇒ The old offset values for height and width are displayed in the window.

Tolerance:	Height and width 0 mm ... + 25 mm. The cassette format applies as a basic value.
Default setting:	Overframing (height) = 2; Overframing (width) = 6

NOTE

The display on the collimator, from call up to exiting the SSW, is not relevant.

- Confirm with **OK**.
 - ⇒ If **Cancel** is pressed, no adjustment is made.
 - ⇒ Then a window with the old and the new offset value is displayed.
- Confirm with **OK**.
 - ⇒ The new offset values for height and width are now saved only in the unit!
- Exit the service mode and switch the system off and back on again to permanently save the data in the XCU.

Check

- The collimator display must have changed by the amount of the corrected value.
- If necessary, perform the adjustment again.

Coincidence of light field and radiation field (with centering cross)

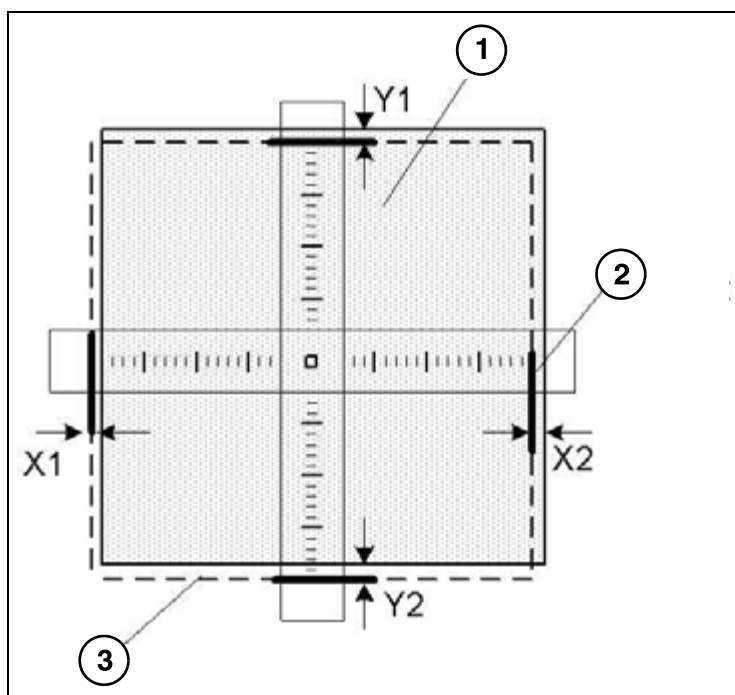


Fig. 14: Light / radiation field 1

- Pos. 1 Radiation field
 Pos. 2 Soldering wire
 Pos. 3 Light field

Prerequisites

NOTE

The alignment of the central ray to the I.I. ([Aligning the central ray to the I.I. / p. 18](#)) has been performed and checked.

- Remove all Cu filters.
- Remove the patient pad, if placed on tabletop.
- Move the unit into 0° position.
- Move the tube assembly and I.I. in the exposure position.
- Manually select a format of 25 cm x 25 cm at the collimator.
- Switch the light localizer on and position the centering cross centrally to the collimated field.
- Mark the edges of the light field with radiation attenuating material (soldering wire) ([Fig. 14 / p. 26](#)).

Check



- Release DR.
- Measure the deviations between the light field edges and radiation field edges on all four sides (X1, X2, Y1, Y2) of the film with the help of the centering cross and note it.

- Calculate the deviations in the X and Y directions according to the following formulae (Fig. 15 / p. 27), (Fig. 16 / p. 27).
 - Ignore the algebraic sign of X1, X2, Y1 and Y2 while calculating X1 + X2 and Y1 + Y2.

$$\sum X(\%) = \left(\frac{X1 + X2}{108\text{cm}} \right) \times 100 \leq 1.2\%$$

Fig. 15:

$$\sum Y(\%) = \left(\frac{Y1 + Y2}{108\text{cm}} \right) \times 100 \leq 1.2\%$$

Fig. 16:

Evaluation

The deviations must not exceed 1.2%.

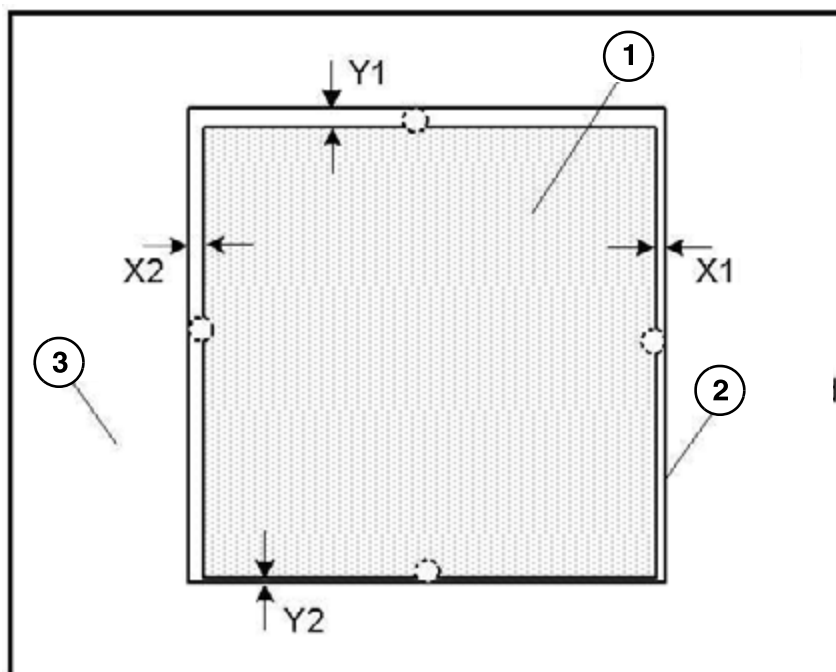
Coincidence of light field and radiation field (without centering cross)

Fig. 17: Light / radiation field 2

- Pos. 1 Radiation field
Pos. 2 Light field
Pos. 3 Film

Prerequisites**NOTE**

The alignment of the central ray to the I.I. ([Aligning the central ray to the I.I. / p. 18](#)) has been performed and checked.

- Remove all Cu filters.

- Remove the patient pad, if placed on tabletop.
- Insert a cassette without film.
- Select the **Examination** task card and select **Uroskop Cassette, 70 kV and 320 mAs** in the list boxes (Fig. 18 / p. 28) of the **Settings** sub task card.
- Move the unit into 0° position.
- Move the tube assembly and I.I. in the exposure position.

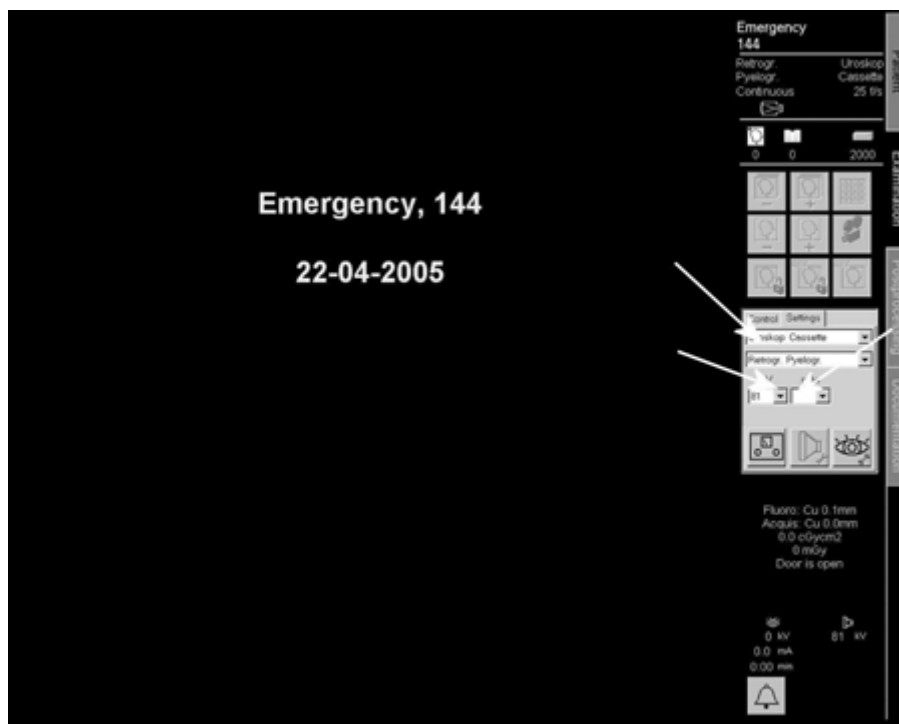


Fig. 18:

- Place a 35 cm x 43 cm cassette on the table.
- Manually select a format of 25 cm x 25 cm at the collimator.
- Switch the light localizer on and mark the light field with washers or coins on the cassette (Fig. 17 / p. 27).

**Check**

- Release DR.
- Measure the deviations between the light field edges and radiation field edges on all four sides (X1, X2, Y1, Y2) of the film with the help of the centering cross and note it.
- Calculate the deviations in the X and Y directions according to the following formulae (Fig. 19 / p. 28), (Fig. 20 / p. 29).
 - Ignore the algebraic sign of X1, X2, Y1 and Y2 while calculating X1 + X2 and Y1 + Y2.

$$\sum X(\%) = \left(\frac{X1 + X2}{108cm} \right) \times 100 \leq 1.2\%$$

Fig. 19:

$$\sum Y(\%) = \left(\frac{Y1 + Y2}{108cm} \right) \times 100 \leq 1.2\%$$

Fig. 20:

NOTE	Distance focus - tabletop = 108 cm
-------------	---

Evaluation

The deviations must not exceed 1.2%.

PDA adjustment

NOTE

If the check of “TV centering” or “Measuring area PDA” according to document “Quality Assurance; IQAP” (SPL5-330.820.02.xx) fails, this adjustment has to be performed.

- Remove the covers of I.I. and light distributor.
- Switch S1 switch on D100 board of the light distributor at I.I. to position “2”.
 - The PDA sensor is illuminated.
- Reattach the cover of the light distributor.
- Start the FLC service mode.
- Select the **Settings** sub task card in the patient list and press the **IQ** button.
- Switch SS switch to the “off” position and release fluoro for approx. 10 sec.
 - The PDA sensor is displayed.

Adjustment

NOTE

In the case of overframing of the PDA sensor, adjust it as described below.

- Start the XCS SSW.
- Select the menu **Components > Polydoros SX > Adjustment > TV Iris**.
- Perform the “TV iris Min/Max. Adjust.” and reduce the **Iris Value** (approx. 180) until the PDA is clearly visible.
- Confirm the settings with **OK** and exit the SSW.

NOTE

The adjustment in case of overframing is completed.

- Release fluoro for approx. 10 sec. (without radiation).
- Start IEM.

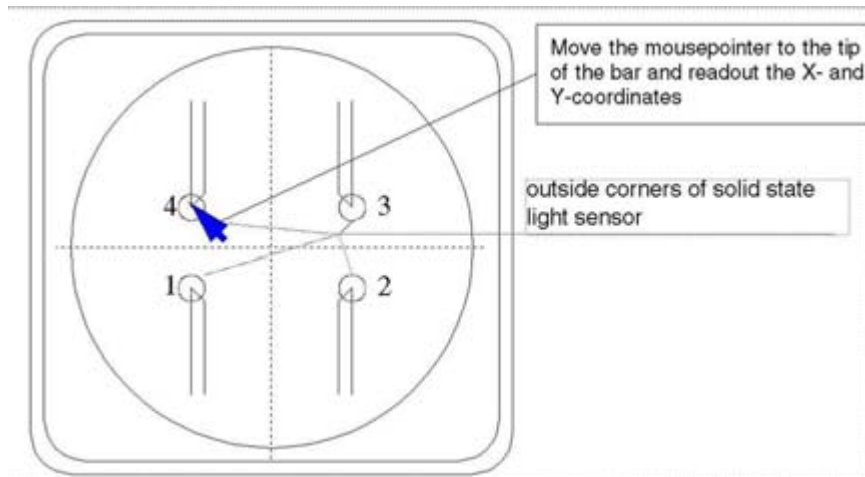


Fig. 21:

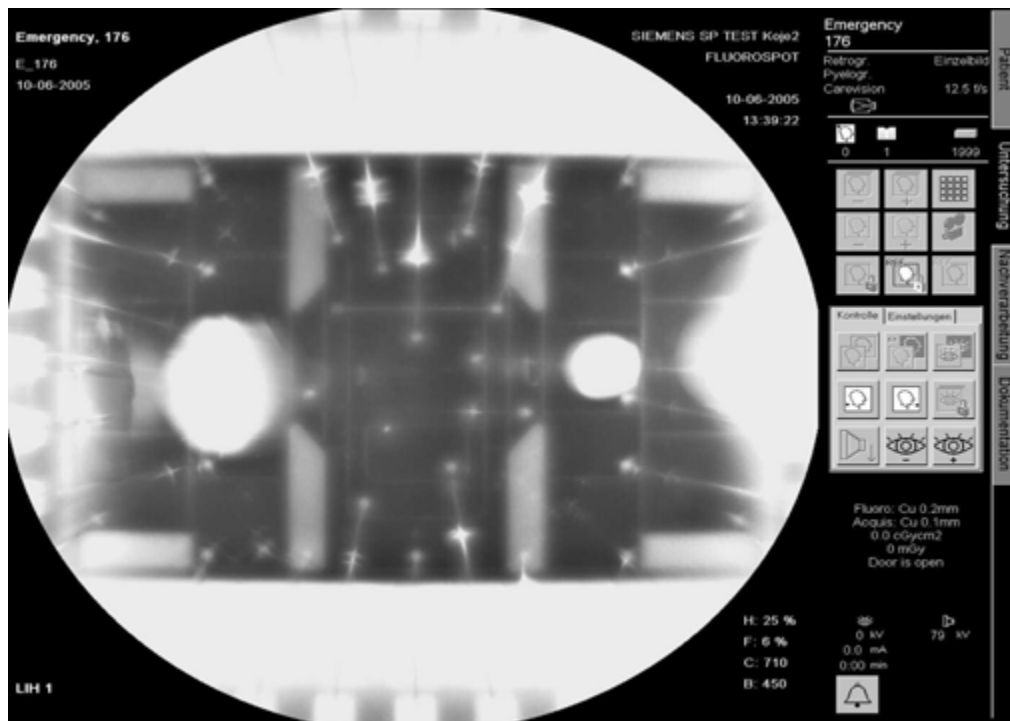


Fig. 22:

- Move the mouse pointer to the tip of the visible bars of the solid light sensor (Fig. 21 / p. 31).
- Readout and record the X and Y coordinates of the mouse pointer displayed in the operating area.
 - Note the results in the table below.

Bar 4		Bar 3	
X position	Y position	X position	Y position
311 - 361	413 - 463	665 - 715	413 - 463
found:	found:	found:	found:
readjusted:	readjusted:	readjusted:	readjusted:
Bar 1		Bar 2	
311 - 361	560 - 610	665 - 715	560 - 610
found:	found:	found:	found:
readjusted:	readjusted:	readjusted:	readjusted:

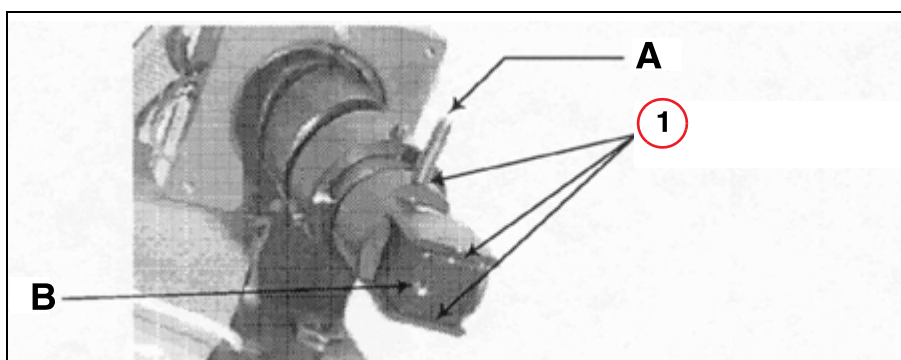


Fig. 23: SDM lacquer

Pos. 1 Red safety lacquer

- In the case of deviation of the PDA (visible bar are out of range as stated in the table above), adjust as follows:

NOTE

During adjustment and lacquering, be careful that no dirt falls into the optical system and onto other optical surfaces.

- Vertical direction: Loosen the grub screw (A/Fig. 23 / p. 32) and rotate the optical system.
- Horizontal direction: Insert a socket wrench (1 mm) or similar long metal pin into the hole and tilt the prism carrier by pressing on it lightly.
- Secure the optical system with safety lacquer on the grub screw and on the prism, see (B/Fig. 23 / p. 32).
- Set switch S1 on D100 of the light distributor at I.I. back to position "1".

- Reinstall the covers.
- Set the SS switch to “On” again.

Dose and PDA adjustment

NOTE

The following three adjustment procedures ([Adjusted mA value during dose setup / p. 34](#)), ([PDA check / p. 35](#)) and ([Setting the TV iris diaphragm / p. 37](#)) must always be performed together.

Adjusted mA value during dose setup

NOTE

If a dose setup is done, enter the value of the adjusted mA in Tab. 3 which is acquired during following procedure.

Tab. 3

mA
found:
readjusted:

Dose rate

- Move the unit to 0° position.
- Attach the 1.2 mm Cu filter to the collimator, with additional filter in the diaphragm **deselected** (0 mm Cu).
- Remove the patient pad if placed on the tabletop.
- Place the dose measuring chamber on the tabletop so that the chamber is positioned in the center ray.
- Select a filter value of 23.5 mm/27.5 mm Al (depending on DIADOS version).
- Select zoom to full format (zoom 0) and the center dominant.

Adjustment

- Start the XCS SSW.
- Select the menu **Components > Polydoros SX > Adjustment > Dose rate**.
- Release fluoro through the service PC.
- Change the tube current during fluoro to adjust the dose rate to following values (Tab. 4).



Tab. 4

	Dose rate on tabletop [nGy/s]	Attenuation factor	Entrance dose at I.I. [nGy/s]
without cassette (option)	1740 ± 5 %	2.0	870 (870 nGy/s x 2)
with cassette (option)	1905 ± 5 %	2.19	870 (870 nGy/s x 2.19)

- Read the dose and note it.
- Switch fluoroscopy off.
- Confirm the window with **OK**.
 ➞ The **PDA Preadjust** menu appears.

NOTE

The **(PDA check / p. 35)** (described in following subchapter) is compulsory after this dose setup has been performed.

PDA check

- Remove the dose measuring chamber.
- Switches S1 and S2 on D100 in generator must be set to position “1”.
- Select zoom to full format (zoom 0) and open the collimator fully.
- Release fluoro through service PC.
 - The displayed value **expected actual value [1/4]** has to be **0 ± 1**.

NOTE

If the “expected actual value [1/4]” is not correct, perform the PDA adjustment as described below.

Adjustment

- In the case of deviation, adjust as follows:
 - Remove the cover of the light distributor.
 - In the case of a negative deviation of the **expected actual value [1/4]**, turn R1 on D100 of the light distributor to the left.
 - In the case of a positive deviation of the **expected actual value [1/4]**, turn R1 on D100 of the light distributor to the right.
 - After adjusting with R1 reattach the cover.
- Repeat the measurement.
- Confirm with **OK**.
 - The **PDA sensitivity Autocalibration** menu appears.

- Start the auto calibration by selecting the **Start** button.
 - ⇒ The auto calibration is automatically performed for all I.I. formats and all dominant selections.
- Compare the results in the table in the **PDA-adjusted value [EP/16]** as follows.

NOTE

If the basic adjustment for the PDA could not be performed correctly, the text "AbsDiff value is bigger than 24" may appear and indicates an error.

After acknowledging with "OK" a list of the values set is displayed.

On the basis of the values in the first column (I.I. full format) it is possible to determine which dominants were set incorrectly. If more than one dominant was incorrectly adjusted, replace the PDA.

- ⇒ The value "Max. II-Format" for **2 dominants in parallel** must correspond approximately to the value of the **circular dominant (approx. 0)**.
- ⇒ The largest value must result for **all three dominants (left, middle, right) in parallel (approx. 65)**.
- ⇒ The value for the **individual dominants** must be **approximately 50**.
- If it can be determined that only one dominant was calculated incorrectly, the error may be in the cabling or on D100.
- In the case of deviations larger than $\pm 30\%$, perform the setting again:
 - Exit the **TV iris: Min/Max. Adjust** menu with **Skip**.
 - Select **Cancel**.
 - Select **Dose Rate Adjust** and repeat the adjustment.
- Then exit the **PDA Adjusted Values [EP/16]** window with **OK**.
 - The **TV Iris: Min/Max. Adjust** window automatically appears.

NOTE

The [\(Setting the TV iris diaphragm / p. 37\)](#) (described in following subchapter) is compulsory after the PDA check has been performed.

Setting the TV iris diaphragm

Min/max setting

- The menu **Components > Polydoros SX > Adjustment > TV Iris** is selected automatically after the PDA check.

Adjustment

- In the “TV Iris Diaphragm: Min/Max Adjust” window change reference value A (maximum opening) until the yellow LED (V29) on D190 board in the generator extinguishes.
- Repeat this procedure for reference value B (minimum opening) for the yellow LED (V28) on D190 in the generator.
- Confirm with **OK**.
 - The “TV Iris: Brightness Adjust” window appears.

NOTE

The [\(Iris basic setup / p. 37\)](#) (described in following subchapter) is compulsory after the [\(Min/max setting / p. 37\)](#).

Iris basic setup

First iris adjust step



- Confirm the **Polydoros Service** window with **OK**.
- Place a 2.1 mm precision Cu filter in the collimator.
- Release fluoro by selecting **ON** in the XCS SSW window.
- Adjust the **Iris** value in the XCS SSW ([2/ Fig. 24 / p. 38](#)) as far as a **B-Signal** value of **110 ± 10%** is adjusted.

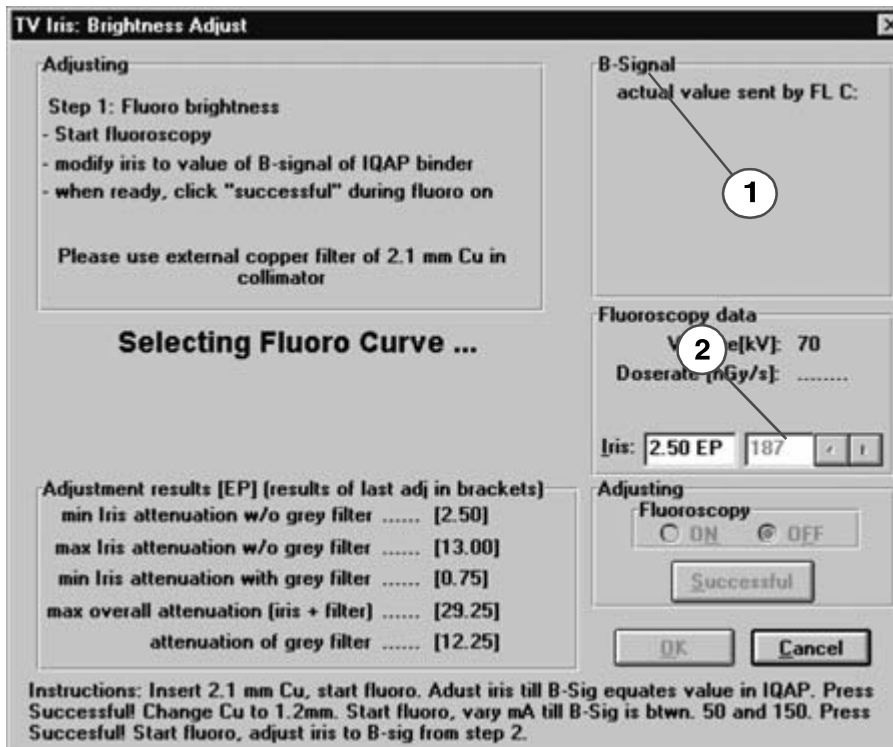


Fig. 24:

- Select the **Successful** button after the successful adjustment of the iris value **but still under radiation**.

Second iris adjust step

- Place a 1.2 mm precision Cu filter in the collimator.
- Select **2.5 mA** as start value in the XCS SSW.
- Release fluoro by selecting **ON** in the XCS SSW window.
- Adjust the mA value in the XCS SSW as far as a **B-Signal** value of **110 ± 10%** is adjusted.
- Select the **Successful** button after successful adjustment of the iris value **but still under radiation**.



Third iris adjust step

- Select an iris value of approx. "40".
- Release fluoro by selecting **ON** in the XCS SSW window.
- Adjust the iris value in the XCS SSW as far as a **B-Signal** value of **110 ± 10%** is adjusted.
- Select the **Successful** button after successful adjustment of the iris value **but still under radiation**.
- Exit the adjustment procedure with **OK**.
- Switch system off and on again.



Zoom / Iris correction

- Attach 2.1 mm precision Cu filter to the collimator.
- Select the menu **Components > Polydoros SX** in the XCS SSW and subsequently **Adjustment > Zoom Iris Correction**.
 - The following window appears (Fig. 25 / p. 39).

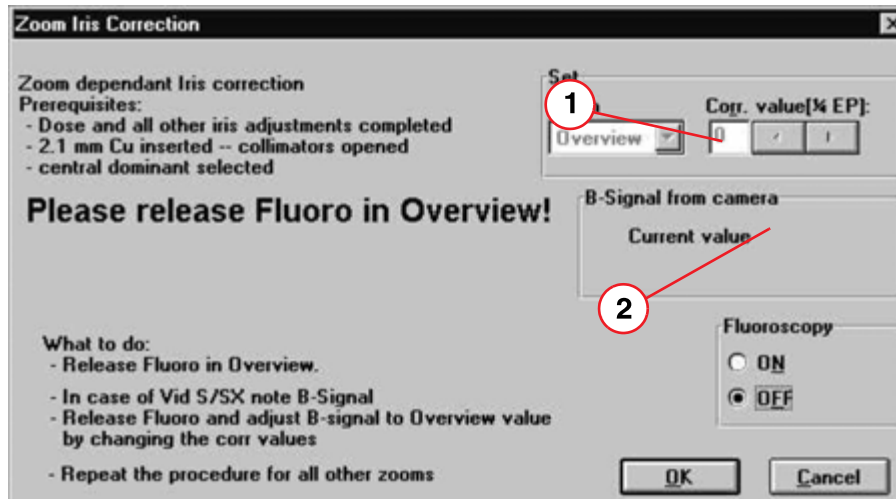


Fig. 25:

NOTE

The central dominant is selected automatically.



- Check on the tableside control unit if the XCS SSW has selected zoom 0 (overview).
 - If zoom 0 is not selected automatically, please select it.
- Switch the radio button for **Fluoroscopy** to **ON** and allow the generator to stabilize.

NOTE

A "B-Signal from camera" value of $110 \pm 10\%$ has to be adjusted (2/ Fig. 25 / p. 39) by changing the "Corr. value [1/4 EP]" value (1/ Fig. 25 / p. 39).

- Switch fluoro off.
 - Zoom 1 is selected automatically. Nevertheless check if it has been selected.
- Switch the radio button for **Fluoroscopy** to **ON** and allow the generator to stabilize.
- Change the **Corr. value [1/4 EP]** value as long as a **B-Signal from camera** value of $110 \pm 10\%$ is adjusted.
- Switch fluoro off.
- Repeat this check and adjustment for the residual zoom steps.

NOTE

The correction values are set in 1/4 exposure points. Therefore, the tolerance of the center value is higher.

- Perform the adjustment until the correct value is obtained.

- When all zoom steps are adjusted, confirm the window with **OK**.
- Exit the XCS SSW and switch the system off and on again.

Brightness correction for DR and PFL

- Select **OGP 1** (service OGP) as described in subchapter ([Service organ programs / p. 17](#)).
- Press **Default values** and subsequently **Store**.
- Repeat these steps for service OGPs **OGP 2**, **OGP 3** and **OGP 4**.

NOTE

The prerequisite for this adjustment is a completed ([Adjusted mA value during dose setup / p. 34](#)), ([PDA check / p. 35](#)), ([Min/max setting / p. 37](#)), ([Iris basic setup / p. 37](#)) and ([Zoom / Iris correction / p. 39](#)).

- Check if the LEDs V28 and V29 at D190 board of the generator are **not** illuminated.
- Attach 2.1 mm precision Cu filter to the collimator.
- Select zoom 1 and open the collimator fully.
- Select **Adjustment > TV Param** in the XCS SSW.
 - The following window appears ([Fig. 26 / p. 40](#)).

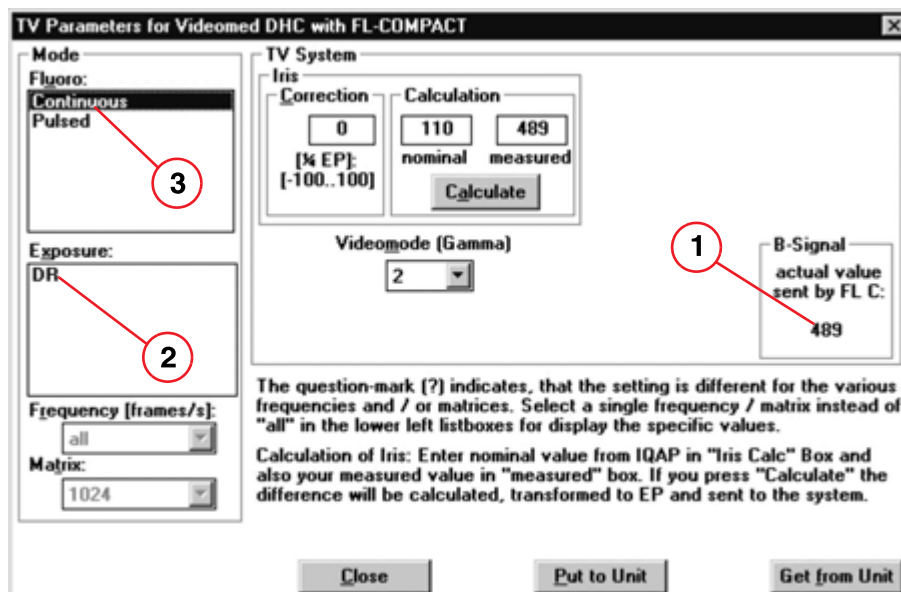


Fig. 26:

- Select **Continuous** under **Mode > Fluoro**: ([3/ Fig. 26 / p. 40](#)).

NOTE

Do not change the iris value under **TV System > Iris > Correction** ([Fig. 26 / p. 40](#)).



- Select the **OGP 1** at the FLUOROSPOT Compact.
- Release fluoro for approx. 5 sec.



- Check if the **B-Signal actual value sent by FL C:** value is **110 ± 10%** (1/Fig. 26 / p. 40).
- Select **Pulsed** under **Mode > Fluoro:** (3/Fig. 26 / p. 40).
- Select the **OGP 2** at the FLC.
- Release fluoro for approx. 5 sec.
- Check if the **B-Signal actual value sent by FL C:** value is **110 ± 10%** (1/Fig. 26 / p. 40).
 - In case of deviation, adjust the TV iris correction value automatically by pressing the **Calculate** button (Fig. 26 / p. 40).
 - After the calculation, transfer the value by pressing the **Put to Unit** button.
- Select **DR** under **Mode > Exposure:** (2/Fig. 26 / p. 40).



- Select the **OGP 2** at the FLC.
- Release fluoro for approx. 5 sec.
- Check if the **B-Signal actual value sent by FL C:** value is **110 ± 10%** (1/Fig. 26 / p. 40).
 - In case of deviation, adjust the TV iris correction value automatically by pressing the **Calculate** button (Fig. 26 / p. 40).
 - After the calculation, transfer the value by pressing the **Put to Unit** button.
- If calculation has been done as described above, repeat the whole procedure for all the modes (**Fluoro: Continuous, Fluoro: Pulsed, Exposure: DR**).
- Exit the **TV Parameters for Videomed DHC with FL-COMPACT** window by pressing **Close** (Fig. 26 / p. 40).

Checking the dose rate

NOTE

The dose measuring chamber has to be documented in the DHHS protocol if a DHHS check is performed.

- Transfer the dose rate D and dose D_{Exp} from Tab. 5 to Tab. 6/Tab. 7 (default values) depending on I.I. size and cassette option.
- Place a 2.1 mm precision Cu filter in the collimator.
 - If there is a Diamentor installed, leave the chamber in the beam path.
- Remove the patient pad if placed on the tabletop.

NOTE

For DIADOS select a filter of 23.5 mm/27.5 mm Al (depending on the DIADOS version).

- Place the dose chamber on the table so that the chamber is on the right or left side of the monitor (Fig. 27 / p. 42).
 - The long side of the chamber has to be parallel to the monitor border. The position of the dose chamber applies to zoom format 3.

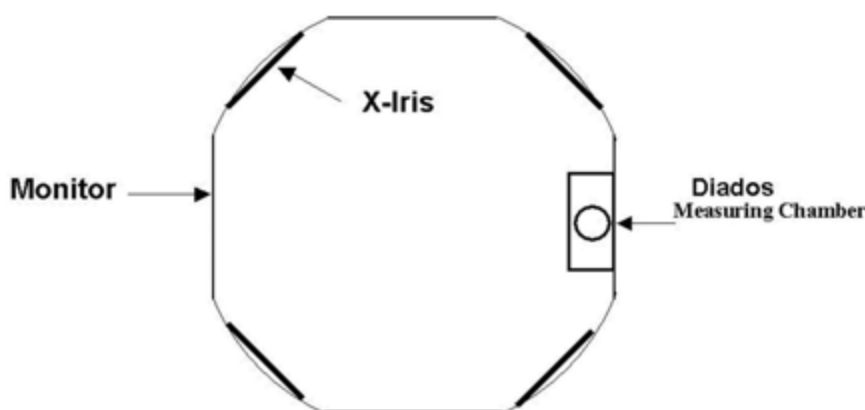


Fig. 27:



- Check the position of the dose chamber under radiation.
- Select FLC service mode.
- Select service organ program OGP 1.

NOTE

Select zoom 1.



- Release fluoro for approx. 5 sec. and measure the dose rate and mA values displayed on the monitor during radiation and record the value in the appropriate table.
 - This is the reference value for the other mA values (displayed mA value = I_{RefA1}).



- Set zoom to full format (zoom 0).
- Release fluoro for approx. 5 sec. and record the mA value displayed on the monitor during radiation in the table.



- Repeat this procedure for all other zoom formats.
- Set zoom to zoom 1 again.
- Select the service organ program OGP 2 (DPF 12.5).
- Release fluoro for approx. 5 sec., measure and record the dose rate and mA value displayed on the monitor during radiation in the table.
- Repeat this step for all the other OGPs listed in Tab. 6.



- Select the service organ program OGP 2 (1 f/s).
- Release DR, measure and record the dose rate per pulse in Tab. 7.
- Calculate the required mA values/dose rates marked with "Calculation" in Tab. 6 by using the calculation factors from Tab. 5.

NOTE

The dose values in Tab. 5 are fixed in the service organ programs. These values do not necessarily match the configured dose values in the customer-specific organ programs.

NOTE

For the values in the dose rate table (Tab. 6) a tolerance of $\pm 10\%$ applies, where no tolerance is expressly written.

Tab. 5

		33 cm I.I. (with cassette)	40 cm I.I. (with cassette)	40 cm I.I. (without cassette)
Zoom 0	Nominal size [mm]	305	365	365
	Calc. Factor C0	0.48	0.72	0.72
Zoom 1	Nominal size [mm]	220	300	300
	Fluoro cont. Dose rate D [nGy/s]	515	263	240
	DR Dose D _{Exp} [μGy/p]	2.74	1.34	1.22
	Calc. Factor C1	1.00		
Zoom 2	Nominal size [mm]	170	220	220
	Calc. Factor C2	1.72	2.09	2.09
Zoom 3	Nominal size [mm]	130	170	170
	Calc. Factor C3	2.47	3.57	3.57

Tab. 6

1	Zoom 0	Zoom 1		Zoom 2	Zoom 3	
	mA	Dose rate [nGy/s]	mA	mA	mA	kV
Fluoro cont. (OGP 1)	$I_{\text{refA1}} * C0$ ($\pm 25\%$)	$D (\pm 10\%)$ = D_m	dis- played mA = I_{refA1}	$I_{\text{refA1}} * C2$	$I_{\text{refA1}} * C3^2$	n.a.
	Calcula- tion:	Default value (Tab. 5):	n.a.	Calcula- tion:	Calcula- tion:	n.a.
	found:	found:	found:	found:	found:	found:
	read- justed:	readjusted:	read- justed:	read- justed:	read- justed:	read- justed:
DPF (12.5 f/s; OGP 2)	n.a.	$D_m/2.4$ ($\pm 15\%$)	n.a.	n.a.	n.a.	
		Calculation:	n.a.			
		found:	found:			
		readjusted:	read- justed:			
DPF (8 f/s; OGP 3)	n.a.	$D_m/3.75$ ($\pm 15\%$)	n.a.	n.a.	n.a.	
		Calculation:	n.a.			
		found:	found:			
		readjusted:	read- justed:			

1	Zoom 0	Zoom 1		Zoom 2	Zoom 3	
	mA	Dose rate [nGy/s]	mA	mA	mA	kV
DPF (3 f/s; OGP 4)	n.a.	$D_m/10$ ($\pm 25\%$)	n.a.	n.a.	n.a.	
		Calculation:	n.a.			
		found:	found:			
		readjusted:	read- justed:			

1. Actual value measured on table top [nGy/s]; [mA]
2. The factor is only valid at 70 kV, otherwise n.a.!

Tab. 7

	Zoom 1
	Dose D_{Exp} [μ Gy/p]
DR (1 f/s; Dose100; OGP 2)	D_{Exp} ($\pm 15\%$)
	Default value (see Tab. 5)
	found:
	readjusted:

Water equivalent adjustment

- Start the XCS SSW and set switch S3 (on board D100 in the generator) to “Service”.
- Select the menu **Components > Polydoros SX > Adjustment > Water Equivalent** in the XCS SSW.
- Place a water phantom (20 cm) in the beam path.
- Remove all Cu filters on the collimator.
- Select the center dominant on the FLC.
- Collimate to the water phantom.
- Switch fluoroscopy **ON**.
- The correction value is determined by pressing the **Evaluate** button. Repeat this procedure several times until the determined correction value has stabilized.
- Confirm the window with **OK**.
- Create a new organ program (as described in the Operating Manual; or in the System Help; UROSKOP /FLC installed at the FLC) with following parameter (Fig. 28 / p. 47) and confirm the settings with **Store**.
 - **Continuous** (1/Fig. 28 / p. 47),
 - **Fluoro Mode > Fluoro2** (3/Fig. 28 / p. 47),
 - **Exposure Data from Fluoro > Yes** (2/Fig. 28 / p. 47),
 - **Auto** checkbox selected (5/Fig. 28 / p. 47),
 - **Characteristic Curve (C) > C29** (4/Fig. 28 / p. 47).



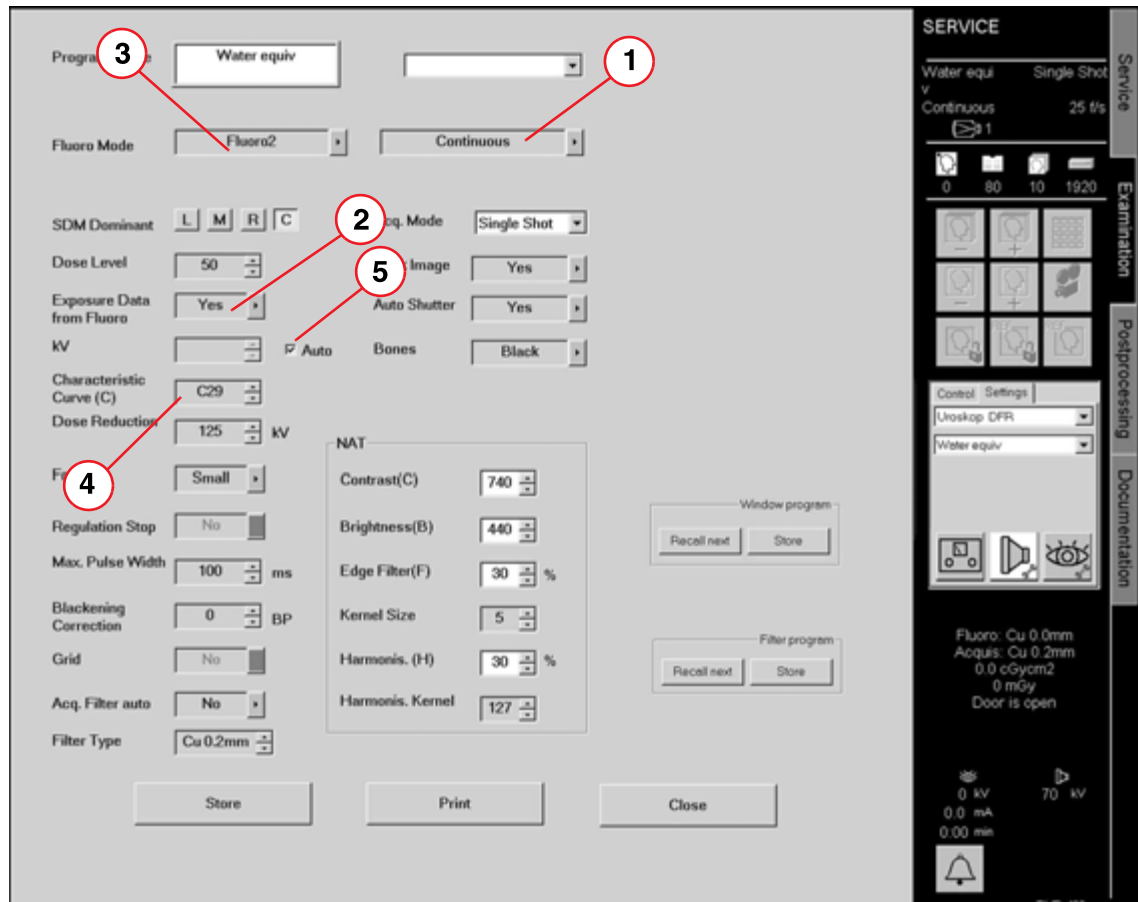


Fig. 28:

- Release fluoroscopy.
⇒ kV values in the range of 68 - 71.5 kV must result.
- Terminate XCS SSW and set switch **S3** to **normal**.

Prerequisites

This chapter comprises the mechanical calibration of the following components:

- lift drive
- tilt drive
- exposure system
- tube parking drive
- cassette drive
- tabletop, longitudinal
- tabletop, transverse
- collimator

NOTE

The pinion gear may not exert any axial or radial pressure on the potentiometer. Because of this, there must always be a minimum gap between the pinion gear on the potentiometer and the pinion gear/tooth belt/toothed rack coupled to the movement.

NOTE

When all adjustments have been completed:

- exit the service mode,
- switch the system off/on again,
- check the functionality of the adjustments.

Movement of drives with service keys S1/S2

NOTE

This subchapter describes how the drive to be calibrated can be moved using service buttons S1/S2 at the tableside control unit at the table in “limited end positions“ mode.

- Connect the service PC via the service cable to the generator (XCU D320 [X5]).
- Start XCS SSW.
- Select **Components > Uroskop**.
 - ⇒ The UROSKOP Access SSW starts.
- Select **Diagnostic > Tests**.
 - ⇒ The **Execute Test Function** window appears.

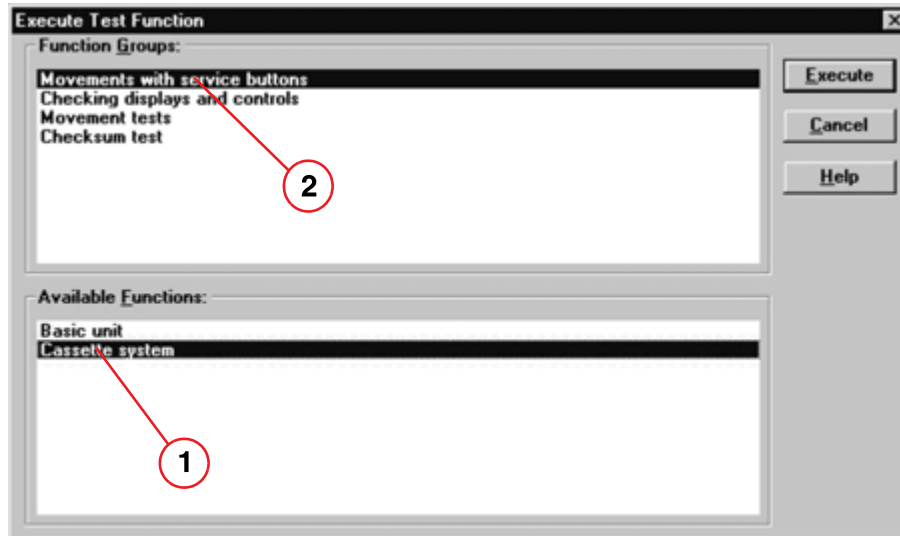


Fig. 29: Window "Execute Test Function"

- Select **Movements with service buttons** under **Function Groups** (2/Fig. 29 / p. 49).
- If you select **Basic unit** (1/Fig. 29 / p. 49) under **Available Functions**, the following window appears (Fig. 30 / p. 50) after selecting **Execute**.
 - Select **Limited end positions** under **Mode**.
 - Select the drive to be moved using service keys **S1/S2** under **Drive**.
 - Move the drive with **S1/S2**.
- If you select **Cassette system** (1/Fig. 29 / p. 49) under **Available Functions**, the following window appears (Fig. 31 / p. 50) after selecting **Execute**.
 - Select **Limited end positions** under **Mode**.
 - Select the drive of the cassette to be moved using service keys **S1/S2** under **Drive**.
 - Move the drive with **S1/S2**.

Movements with service buttons: Basic unit

Select the drive and then the mode.
 "Table transverse" backside = S1
 "Table transverse" frontside = S2
 S1 down
 S2 up

Mode
☒ Limited end positions
☐ Unlimited end positions

Drive
☒ Table lift
☐ Table tilt
☐ Tabletop, longitudinal
☐ System longitudinal
☐ Tabletop, transverse
☐ Tube parking

State
Passive

Position
1253 bits

Press Enter when done

OK Help

Fig. 30: Movements with service buttons: Basic unit

Movements with service buttons: Cassette system

Select the drive and then the mode.
 "Table transverse" backside = S1
 "Table transverse" frontside = S2
 S1 exposure position
 S2 parking position

Mode
☒ Limited end positions
☐ Unlimited end positions
☒ Slow
☐ Very slow

Drive
☒ Cassette drive
☐ Cassette feeder

State
Passive

Position
679 bits

Press Enter when done

OK Help

Fig. 31: Movements with service buttons: Cassette system

Zero adjustment method

NOTE

This subchapter describes how to access the appropriate UROSKOP Access SSW window for adjustments according the zero adjustment method mentioned in the following subchapters.

- Select **Adjustment > Calibrations** in the UROSKOP Access SSW.
⇒ The **Execute Calibration Function** window appears.

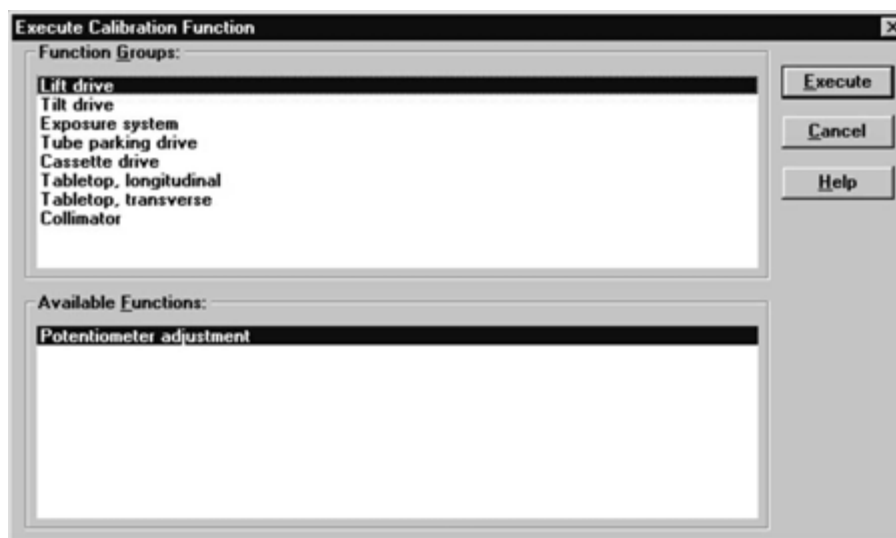


Fig. 32: "Execute Calibration Function" Window

- To perform an adjustment, select the desired component from the **Function Groups** and **Available Functions** submenus and confirm by double-clicking or click the **Execute** button.

Calibration of lift drive

Prerequisites

- Move the unit into the 0° position.
- Using the service keys, move the lift drive into the reference position ([Fig. 33 / p. 52](#)).

NOTE

The reference position is 600 ± 1 mm from the table support edge to the finished flooring.

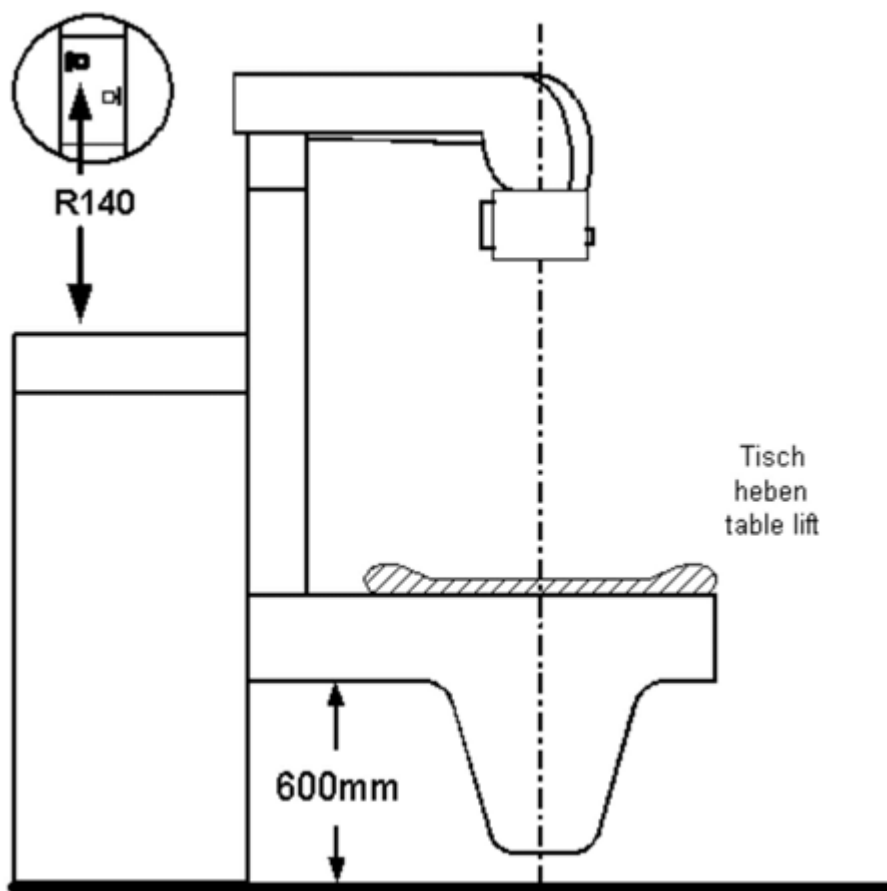


Fig. 33: Adjustment - table lift

Adjustment

Access: through lifting base (see arrows ([Fig. 33 / p. 52](#)))

Potentiometer: M2.R140

Board and connectors: D1.X141 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the drive into the min. position.
 - ⇒ I. I. distance to floor (with I. I. collision protection) ≥ 4 cm (≥ 8 cm for systems with 33 cm I. I.; see also subchapter [Room dimensions / p. 72](#)).

Calibration of tilt drive ($\pm 90^\circ$)

Prerequisites

- Using the service keys, move the tilt drive into the reference position (Fig. 34 / p. 54).

NOTE

Two equal reference positions are possible:

1. Use a spirit level placed on the tabletop at $0 \pm 0.5^\circ$.
2. Adjust the distance from the top surface of finished floor to the tabletop head end/foot end so that they are equal ($\pm 5\text{mm}$).

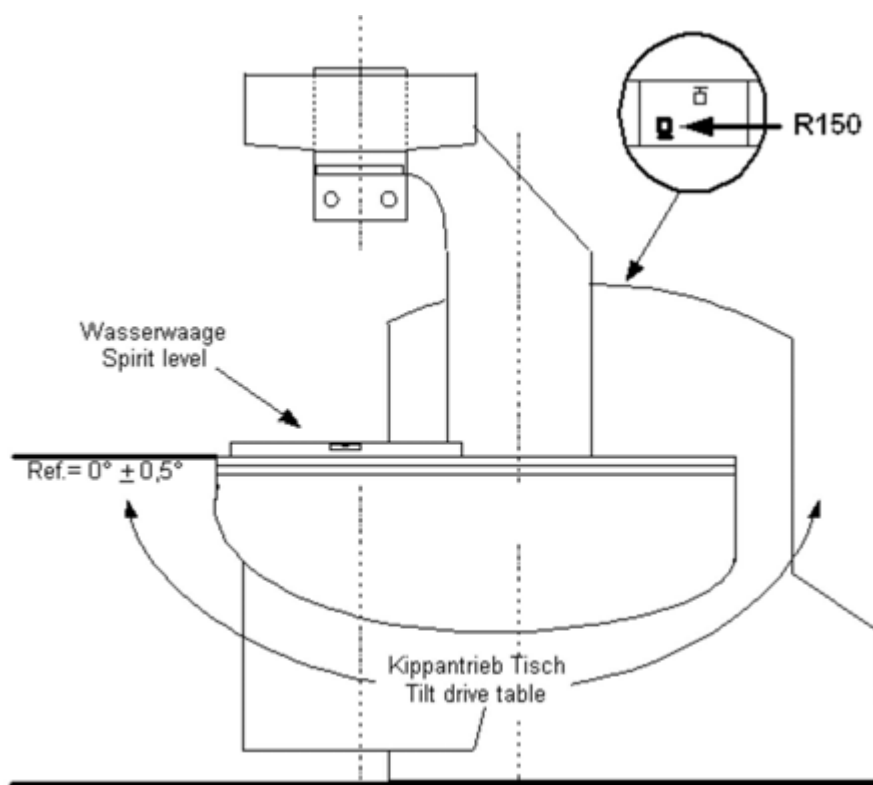


Fig. 34: Adjustment - table tilt

Adjustment

Access: Through lifting base (see arrows (Fig. 34 / p. 54)).

Potentiometer: M2.R150

Board and connector: D1.X151 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the tilt drive to max. +/-.
 - ⇒ The spacing of the opening in toothed segment to safety switch M2.S150 has to be at least 3 mm.
- Move the unit into the 0° position and check the position.

Correction

- If necessary, correct by adjusting the potentiometer.

Calibration of tilt drive (limitation of +90° position)

Prerequisites

The potentiometers for the lift drive, tilt drive (+/- 90°) and tabletop longitudinal drive have been adjusted.

NOTE

On customer request, the standard end position can be changed.

- Use the service keys to move the unit to the desired end position, e. g. +88°.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the unit approx. 10° out of the end position and then back into the end position.

Required

Movement to the required end position.

Correction

- Perform the adjustment again.

Calibration of tilt drive (limitation of -90° position)

Prerequisites

The potentiometers for the lift drive, tilt drive (+/- 90°) and tabletop longitudinal drive have been adjusted.

NOTE

On customer request, the standard end position can be changed.

- Use the service keys to move the unit to the desired end position, e. g. -88°.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the unit approx. 10° out of the end position and then back into the end position.

Required

Movement to the required end position.

Correction

- Perform the adjustment again.

Calibration of exposure system

Prerequisites

NOTE

Prior to this calibration, the central ray alignment ([Setting the central ray / p. 18](#)) has to be checked.

- Set the table in the +90° position.
- Using the service keys, move the system longitudinal drive to the reference position ([Fig. 35 / p. 58](#)).

NOTE

The reference position is 170 ± 1 mm distance between both edges ([Fig. 35 / p. 58](#)).

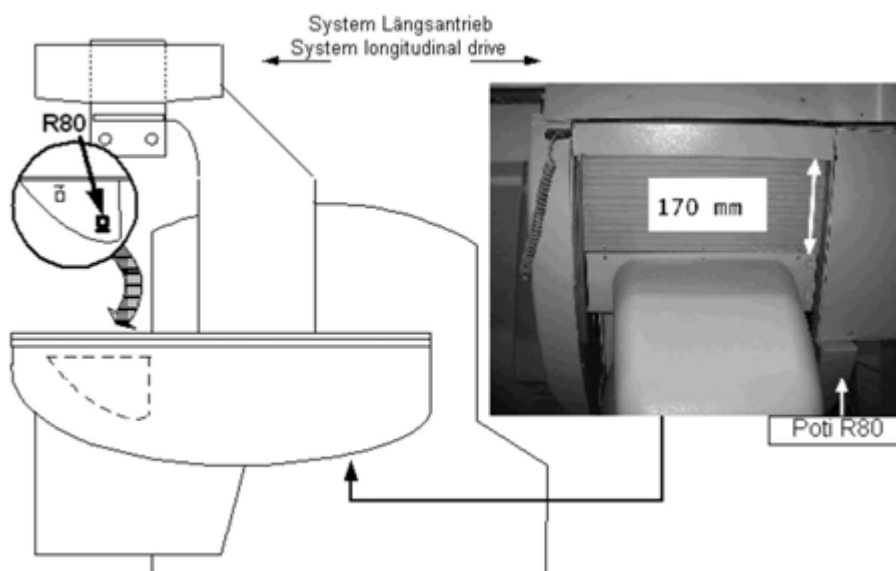


Fig. 35: Adjustment - system longitudinal

Adjustment

Access: Remove the cover at the foot end (see arrow ([Fig. 35 / p. 58](#))).

Potentiometer: M3.R80

Board and connector: M2.U80 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.

- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check - max. head end

- Move the exposure system to max. head end.

Required

NOTE

The following distance required applies only for systems without a cassette option!

Minimum distance to the safety end switch is 5 mm.

Correction

- Adjust the potentiometer M3.R80.

Check - max. foot end

- Move the exposure system to max. foot end.

Required

Minimum distance to the safety end switch is 5 mm.

Correction

- Adjust the potentiometer M3.R80.

Final check

- Check the central ray alignment of the cassette ([Checking the coincidence of radiation field center and film center / p. 20](#)).

Calibration of tabletop, longitudinal

Prerequisites

- Use the service keys to move the tabletop longitudinal drive to the reference position at foot end (Fig. 36 / p. 60).

NOTE

The reference position is the tabletop flush with frame (+/- 1 mm) at the foot end (Fig. 36 / p. 60).

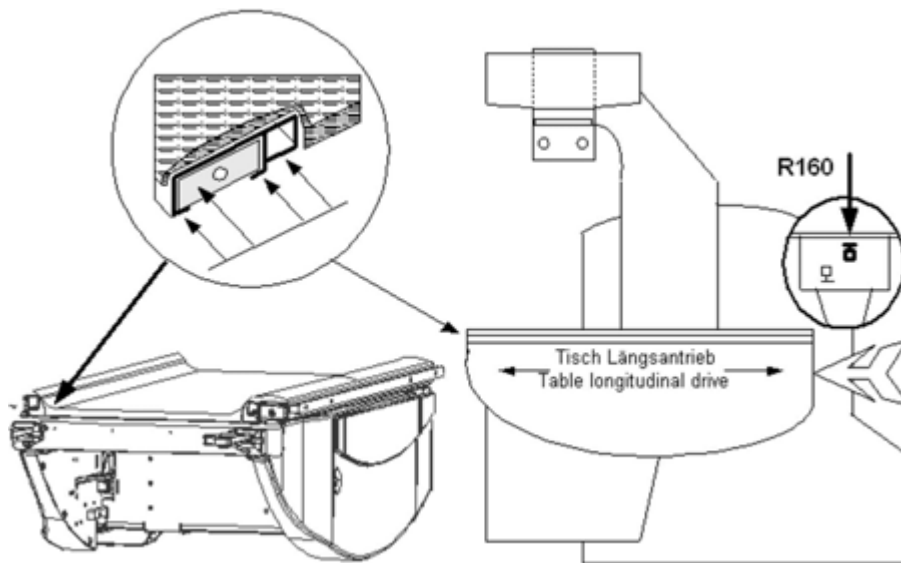


Fig. 36: Adjustment - tabletop longitudinal

Adjustment

Access: At table head end (see arrow (Fig. 36 / p. 60)).

Potentiometer: M5.R160

Board and connector: D1.X161 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.

- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the table to the 0° position.
- Move the tabletop longitudinal to the maximum headwards/footwards.

Required

+ 200/- 500 mm (+/- 5 mm)

NOTE

The limitation of the movements, if the system is tilted > 60°, must be taken into consideration.

Correction

- Adjust potentiometer M5.R160.

Calibration of tabletop, transverse

Prerequisites

- Remove front cover of column.
- Use the service keys to move the table into reference position (Fig. 37 / p. 62).

NOTE

The reference position of the table is 200 ± 1 mm distance from column to table accessory rails (Fig. 37 / p. 62).

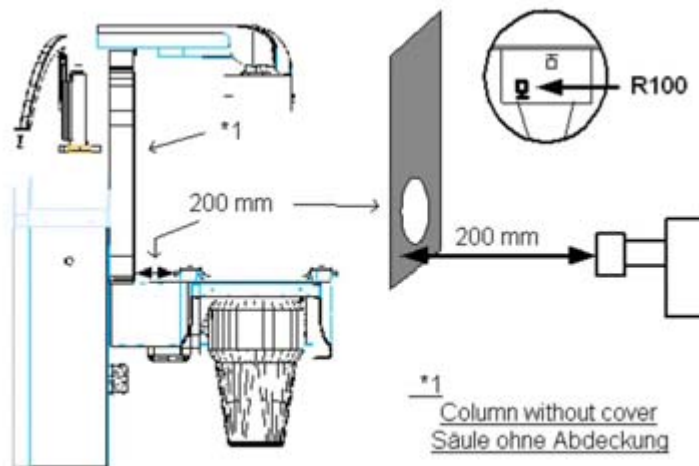


Fig. 37: Adjustment - tabletop transverse

Adjustment

Access: At table head end (see arrow (Fig. 37 / p. 62)).

Potentiometer: M6.R100

Board and connector: BUC D1.X101 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.

- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the table max. forwards and backwards.

Required

The range distance is +/- 12.5 cm.

Calibration of tube parking drive, speed

NOTE

The current percent speed is displayed in the SSW window and can be changed in steps using the +/- button within a range of 30% to 100%.

8 - 9 seconds are required to move from the park position to the work position.

The following limitations can be set at the customer's request:

- The speed can be reduced only as much as a reliable movement and braking of the drive is assured into all unit positions.

NOTE

Otherwise very sporadic errors will occur!

- The speed can be increased only as much as a reliable switch-off of the range limit switch is assured. Otherwise, the tube can hit the end stop hard!

NOTE

Otherwise, the tube can hit the end stop hard, which can lead to mechanical deformation!

- The new speed setting is effective when **OK** is pressed.
 - ⇒ A window with the new and old percent speed is displayed.
- Confirm with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- With the required setting of 8 sec. - 9 sec., carry out the movement of the tube and check the time.
- With the setting requested by the customer, check the movement of the tube for reliable function.
 - ⇒ The position switches must be activated safely in exposure and park position.
 - ⇒ The drive must stand at mechanical stop.

Correction

- Perform adjustment again.

Calibration of cassette drive

Prerequisites

- The calibration of the exposure system has to be performed prior to this adjustment work ([Calibration of exposure system / p. 58](#)).
- Remove the cover head end.
- Move the cassette to the reference position (([Fig. 39 / p. 66](#)), ([Fig. 40 / p. 66](#))) using the service keys **S1/S2**.

NOTE

Reference position: Side plate edge ([1/ Fig. 40 / p. 66](#)) and cassette box edge ([2/ Fig. 40 / p. 66](#)) have to be flush (± 1 mm).

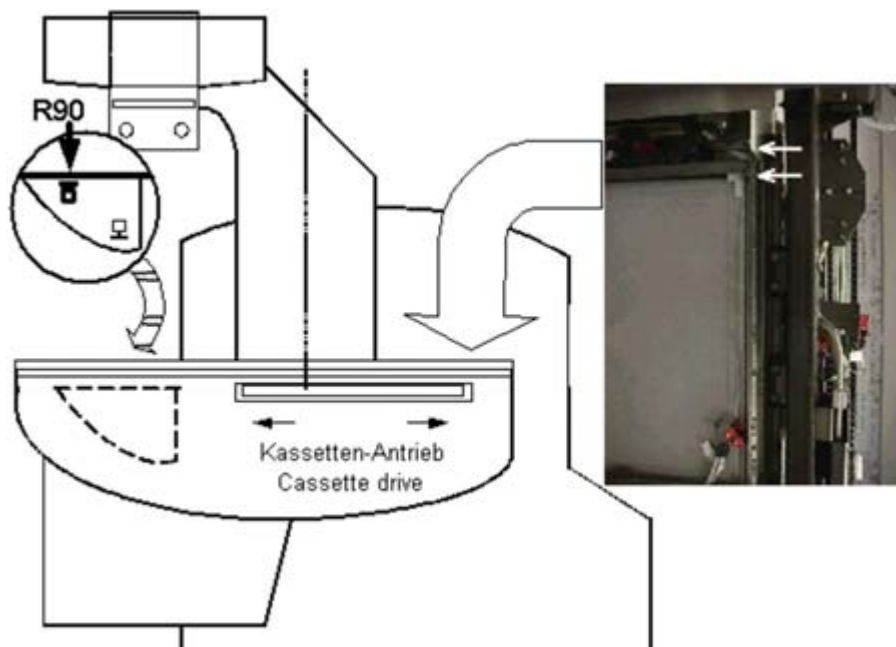


Fig. 38: Adjustment - cassette drive

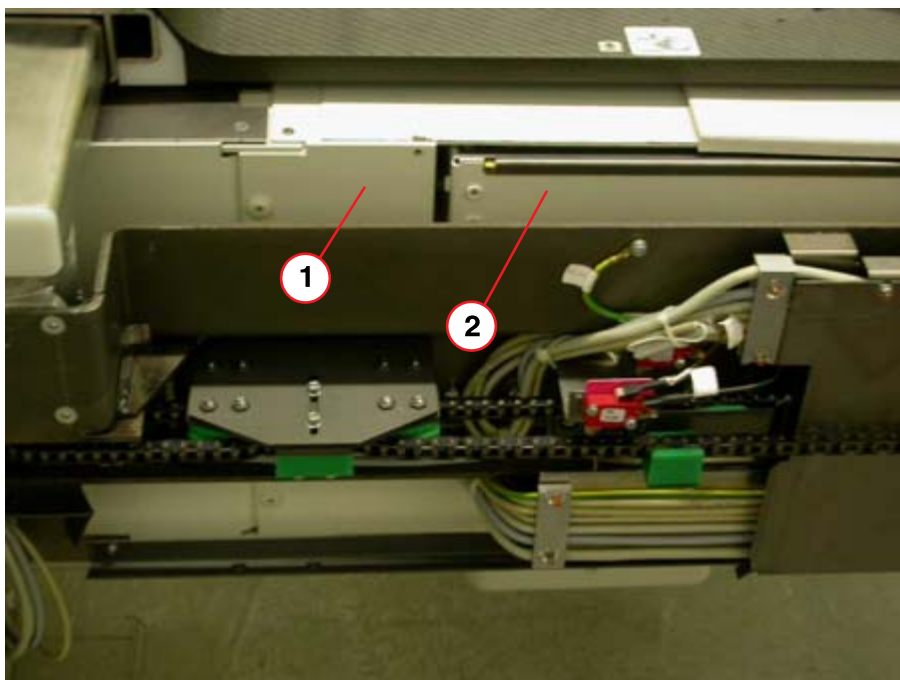


Fig. 39: Cassette position - 1

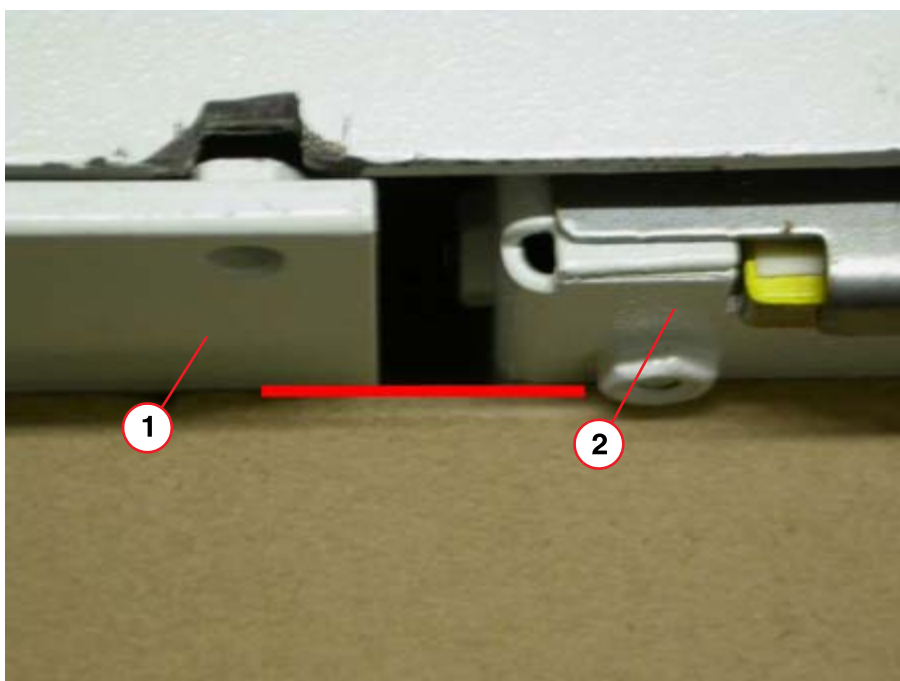


Fig. 40: Cassette position -2

Adjustment

Access: At table foot end (see arrow (Fig. 38 / p. 65)).

Potentiometer: M3.R90

Board and connector: M4.U90.X101 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Check the cassette loading position.
- Carry out the check of the central ray alignment of cassette ([Checking the coincidence of radiation field center and film center / p. 20](#)).

Calibration of cassette, load speed

NOTE

Changing the parameters affects the time it takes for the cassette to load.

The basic speed is equal to 55% (adjustment range 45% - 90%).

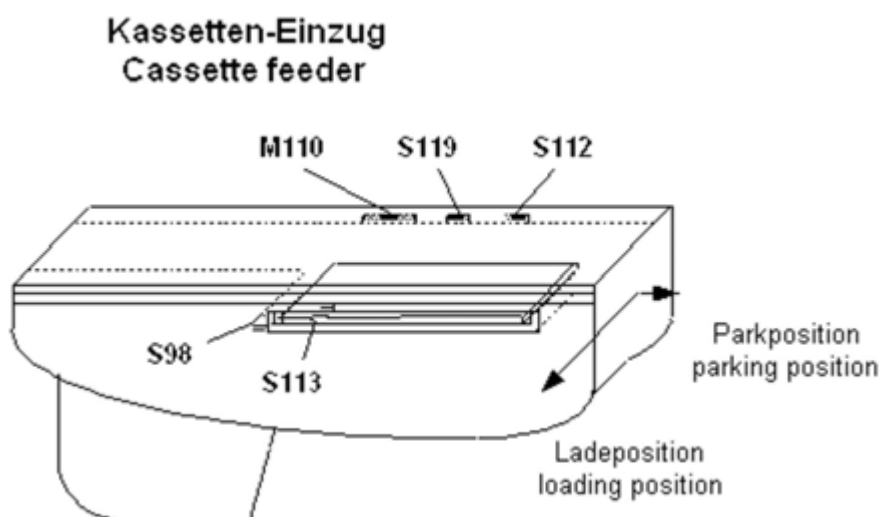


Fig. 41: Adjustment - cassette feeder

M110	motor
S98	cassette tray
S113	cassette front
S112	cassette rear
S119	cassette registration

Adjustment

- Place a 35 cm x 43 cm cassette into the load slot.
- Press the insert button.

Required

The cassette moved into the park position.

- Perform the test several times.
- Enter the percent speed using the +/- buttons.
 - ⇒ A change in speed is evident only when steps with changes of 3% or more are made. When this is done, the old and the new speed are displayed in the window.

- The new speed becomes effective when **OK** is pressed.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new speed.
- Confirm with **OK**.
 - ⇒ The new speed is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Collimator, speed of plates

The speeds in the individual zoom steps and the individual plates for width, height and iris cannot be affected. These are derived from the basic speed.

Adjustment

- Select **Adjustment > Calibrations** in the UROSKOP Access SSW.
⇒ The **Execute Calibration Function** window appears.

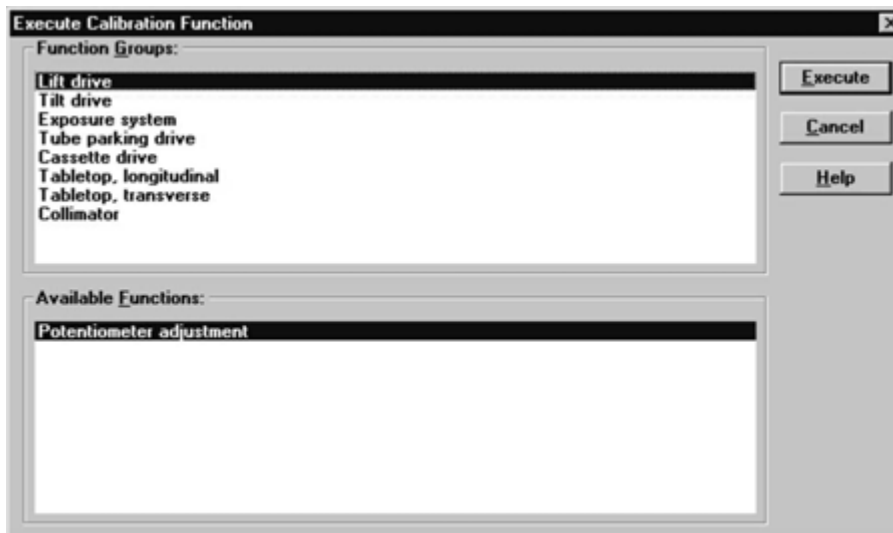


Fig. 42: "Execute Calibration Function" Window

- Select **Collimator** under **Function Groups** and **Speed of plates** under **Available Functions** and confirm by double-clicking or click the **Execute** button.
- Select the desired basic speed according to the customer's request.
- Enter the speed value using the **+/-** buttons (range of values: 3 - 31).
⇒ When this is done, the old and new speed values are displayed in the window.
- The new speed value becomes effective when **OK** is pressed.
⇒ If **CANCEL** is pressed, no adjustment is performed.
⇒ A window is displayed with the old and the new speed values.
- Confirm with **OK**.
⇒ The new speed is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Check the desired basic speed value.

Correction

- Repeat the adjustment.

Collimator, switch-on time light localizer lamp

The switch-on time is adjustable in 3 steps: 30 / 60 / 90 seconds.

Adjustment

- Select the desired time.
- Confirm with **OK**.
 - ⇒ The new time is now saved only in the unit!
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Check the desired time.

Correction

- Repeat the adjustment.

Room dimensions

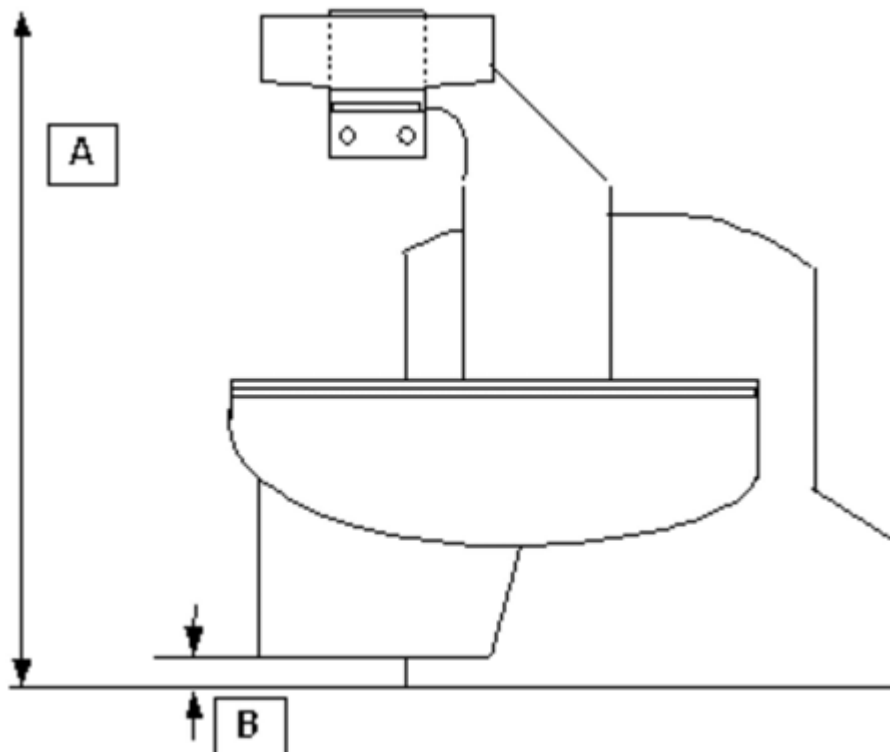


Fig. 43: Room dimensions - 1

NOTE

The room dimensions are used as a basis for collision calculation. They can be entered in cm or inches. In principle, only the distances to the first obstruction, e. g. the ceiling rails in the tilt range, are used as measurement value.

NOTE

The collision computer allows the attachment of a footboard at the head end and foot end, i. e. for calculation purposes the table length is considered to be extended by 30 cm at both ends.

NOTE

The SSW automatically limits the unit movement.
Observe the country-specific safety regulations.

Ceiling height/distance from floor to I. I.

NOTE

The factory default value "Distance from floor to I. I." is 6 cm.

NOTE	<p>Only valid for UROSKOP Access with 33 cm I. I.!</p> <p>The default value for “Distance from floor to I. I.” is 10 cm.</p>
NOTE	<p>With configuration of the unit and of the correct I. I. size, the “Distance from floor to I. I.” range is automatically displayed in the SSW.</p>
NOTE	<p>The distance 4...40 cm entered in the UROSKOP Access SSW refers to the distance between the bottom edge of the I. I. and the floor and must be at least 6 cm/10cm.</p> <p>The distance between the I. I. collision protection and the floor is therefore approx. 2 cm lower (4 cm/8 cm).</p>

- Move the unit into 0° position.
- Measure the distance A from the floor to the ceiling (Fig. 43 / p. 72).
- Select **Components > Urooskop**.
 - ⇒ The UROSKOP Access SSW starts.
- Select **Adjustments > Room Dimensions**.
- Enter the **Room height** and **Distance from floor to I. I.** (Fig. 44 / p. 73).
 - ⇒ A safety distance of 5 cm is always taken into consideration for the **Room height** through SW.

Room Dimensions

Select unit (cm or inches).
 Room height: Enter the distance from floor to ceiling or to 1st obstruction.
 Distance from floor to the I.I.: Enter the minimum distance from floor to I.I.

Dimensional unit
☒ cm ☐ inch

Distances

Room height	<input type="text" value="300."/>	cm	250.0..500.0
Distance from floor to I.I.	<input type="text" value="4."/>	cm	4.0..40.0

Press Enter when done

OK Cancel Help

Fig. 44: Room dimensions -2

- Confirm the entries with **OK**.
 - ⇒ A window is displayed with the old and the new values.
- Confirm with **OK**.
 - ⇒ The new time is now saved only in the unit!
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Checking the distance from floor to I. I.

- Move the unit into the 0° position.
- Position the unit in the center of the travel range and move it to the minimum table height.
- Measure the distance from the lowest point of the I. I. with I. I. collision protection cover to the floor (Fig. 43 / p. 72).

Required

1. $D \geq 4 \text{ cm}$
2. $D \geq 8 \text{ cm}$ (for systems with 33 cm I. I.)

Correction

- If the distance $D < 4 \text{ cm}/8 \text{ cm}$, record the difference to the desired value.
- Move the unit from the lowest position of the lifting base to the highest position.
- Increase the input value for **Distance from floor to I. I.** by the difference recorded.
- Check the distance by moving the unit into the lowest position of the lifting base again.
- Terminate the XCS SSW.
- Switch the system off and on again.

Checking the tabletop movement to ceiling height

- Position the tabletop approx. flush with the frame.
- Move the longitudinal carriage approx. in the center of the travel range.
- Position the unit completely upright (+90° and -90°).
- Move the tabletop out all the way in the longitudinal direction (in direction of ceiling).

Required

- Distance of tabletop to ceiling min. 5 cm

Correction

- If a distance A from the floor to the ceiling is lower than the min. value in the screen (Fig. 44 / p. 73), make a note of the difference.

- Decrease the entered value for the actual room height in the SSW window by the difference noted.
- Move the unit into the 0° position.
- Enter the actual room height under **Room height** (Fig. 44 / p. 73).
- Confirm the entry with **OK**.
 - ⇒ A window is displayed with the old and the new values.
- Confirm with **OK**.
 - ⇒ The new time is now saved only in the unit!
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.
- Check the tabletop movement to ceiling height again.

Checking the tabletop movement footward

- Position the tabletop approx. flush with frame.
- Move the longitudinal carriage approx. in the center of the travel range.
- Position the unit completely upright.
- Lower the tabletop all the way to the end position.
- Measure the distance from the floor to the lowest point of the tabletop.

Required

1. Distance from the floor approx. 34 cm (without footboard)
2. Distance from the floor at least 4 cm (with attached footboard)

Chapter 1: new; chapter 2 was taken over from document “Replacement of Parts; System; Basic Unit and Imaging System” (SPL5-330.841.01.04.02; chapter 9); content of chapter 3 was taken over from Urooskop Access Online Help (completely revised)